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Term Paper

Application of translation transformations during the translation of technical texts
from English to Ukrainian.

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Застосування перекладацьких трансформацій під час перекладу технічних
текстів з англійської мови на українську.

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INTRODUCTION.....	1
CHAPTER 1. THEORETICAL PRINCIPLES OF TRANSLATION OF TECHNICAL TEXTS FROM ENGLISH TO UKRAINIAN IN THE UKRAINIAN LINGUISTIC TRADITION.....	3
1.1. Classification of technical translation, types and functions.....	3
1.2. Features of technical text translation (typical translation transformations).....	10
Conclusions to Chapter 1	13
CHAPTER 2. APPLICATION OF TYPICAL TRANSLATION TRANSFORMATIONS IN TECHNICAL TEXTS	14
2.1. Translation analysis of translation transformations from english to ukrainian language.....	14
2.2. Translation of complex one–word and multi–component terms	15
2.3. Translation of the noun models.....	21
2.4. Translation of the abbreviation and term models	23
Conclusions to Chapter 2	26
CONCLUSIONS	27
BIBLIOGRAPHY	28
LIST OF REFERENCE SOURCES	30
LIST OF DATA SOURCES	31
PE3IOME	32
ANNEX A.....	33
ANNEX B	35

INTRODUCTION

The importance of technical information in the world is explained by constant technical progress and the appearance of a huge number of new inventions, and, accordingly, the literature that accompanies them. Dissemination of such information is impossible without the high-quality work of a translator, especially if it concerns a narrow technical field, since technical texts are saturated with special terms and have a certain grammatical structure depending on the type of material that causes problems during translation. Thus, it is necessary to distinguish scientific and technical translation as a separate activity of the translator and an independent practical discipline. From a linguistic point of view, the peculiarities of technical literature affect stylistics, vocabulary and grammar.

The most characteristic lexical feature of scientific and technical literature is the presence in the texts of a large number of terms belonging to a specific subject area. Currently, the study of the peculiarities of the translation of texts of various subject areas is gaining more and more importance and is becoming a relevant direction in domestic and foreign terminology. Therefore, it is important to analyze the specifics of the translation of such texts, as they have a number of linguistic features.

The relevance of this research is determined by the choice of direction and the topic of the work. In our opinion, the relevance of the work is also based on the need to identify the characteristic features of the translation of texts, which will help in achieving the adequacy of the translation.

The object of this research is scientific texts.

The subject is the peculiarities of the translation of such texts.

The purpose of this study is to identify, study and describe the peculiarities of the translation of texts.

Based on the purpose of the research, we formulated the following tasks:

1) selection of scientific texts for the purpose of their further analysis;

- 2) selection of research tools for working with the main terms;
- 3) determination of the main components of the studied texts for their further translation and analysis;
- 4) identification of the main difficulties in the translation of scientific and technical texts;
- 5) formulation of features of translation of scientific texts from Ukrainian to English.

The theoretical basis of our research was the main provisions in the field of translation studies (V.M. Komisariv “Modern translation studies”), term formation (S.N. Gorelikova “The nature of the term and some peculiarities of term formation in the English language”).

Scientific articles, electronic Ukrainian–English dictionaries of physical and mathematical terms, monographs of a scientific and technical orientation served as sources of linguistic material for the research. This research is based on the following research methods:

- 1) a comparative method that determines the similarities and differences of the meanings of Ukrainian and English terms of the studied area;
- 2) statistical analysis used to calculate the frequency of the studied units;
- 3) structural analysis, applied definition of basic units of texts.

The theoretical significance of this research lies in the need to study the peculiarities of the translation of scientific and technical texts in order to systematize knowledge and build a terminology system.

The practical significance of this work lies in the possibility of practical use of the research results by translators who work with scientific and technical texts and documentation. The novelty lies in the study of the specifics of the translation of scientific texts from Ukrainian to English.

The structure of the work: this work consists of an introduction, two chapters, conclusions, and a list of used sources.

CHAPTER 1. THEORETICAL PRINCIPLES OF TRANSLATION OF TECHNICAL TEXTS FROM ENGLISH TO UKRAINIAN IN THE UKRAINIAN LINGUISTIC TRADITION

1.1. Classification of technical translation, types and functions

In connection with the continuous development of technology and the need to spread scientific and technical information, the practical importance of scientific and technical translation has increased. Recently, there have been many works devoted to the problems of translation of scientific and technical materials. Research in the field of technical translation is focused on achieving adequate translations, which helps in solving many applied problems and accelerating the exchange of information in the field of the latest achievements of science and technology among specialists and scientists of certain fields in different countries. A. L. Pumpyansky notes that the first literature devoted exclusively to general issues of technical translation was the book by R. V. Yumpelt, written by him in 1961 (Возна, 2006).

Based on the topic of our research, it is necessary to first define the concept of “translation”. There are many definitions proposed by various specialists in the field of translation studies. For example, V. N. Komisarov offers the following option: “Translation is a type of language mediation, in which a text is created in another language, intended to fully replace the original, as a communicative equivalent of the latter” (as cited in Дергач, 2004).

A. D. Schweitzer includes in the definition the aspect of exchange of cultural information: “Translation is a one-way and two-phase process of interlingual and intercultural communication, in which a secondary text (metatext) is created based on a purposeful (translational) analysis of the primary text, which changes the primary text in another language culture” (as cited in Дергач, 2004).

According to I.S. Alekseeva: “Translation is an activity that consists in variable re-expression, recoding of a text generated in one language into a text in another

language, which is carried out by a translator who creatively chooses an option depending on the variable resources of the language, the type of translation, translation tasks, the type of text and under by the influence of one's own individuality; translation is also the result of the activity described above" (as cited in Главацька, 2014).

On the basis of these definitions, it can be concluded that the purpose of translation is to establish equivalence relations between the original and the translated text (so that both texts carry the same meaning). For this, it is necessary to take into account the context, grammar rules of the source language, writing traditions, etc. Speaking about translation in general, one should mention the general problems of translation. F. Kh. Sytnikova in his article "Problems of the general theory of translation" touches on such a theoretical problem of translation as the unsolved issue of typology (classification of types and subtypes) of translation, which affects the development of the nomenclature of specializations within the translator's profession (as cited in Дубенко, 2005).

Among the authors of translation literature, there is no consensus on the problem of translation typology. What some specialists call types of translation (for example, oral and written translation), other specialists consider forms of translation, distinguishing them from types of translation (artistic, scientific and technical, etc.), which are further divided into genres of translation. Some authors call the types of translation that are more rationally classified as methods and techniques of translation (literal and descriptive translation, tracing, etc.).

Many specialists include in the concept of translation any types of language mediation, such as abstracting, annotation, retelling or adaptation, which causes objections of other authors. As a result, translation typologies and lists of translation specialties proposed by various authors coincide only to a certain extent, and the differences between them are quite significant.

Among other problems of translation, one of the most important is the problem of translation equivalence and adequacy. According to the theory of

V. N. Komisarov, translation equivalence consists in the maximum identity of all levels of content of the original and translated texts (as cited in Дубенко, 2005). In the process of translation, the translator must find and correctly use the necessary elements of the system of equivalent units, on the basis of which communicative equivalent statements in two languages are formed. The limit of translation equivalence is considered to be the maximum possible preservation of the content of the original during translation, however, in each individual translation, the semantic proximity to the original text approaches the maximum in varying degrees. As N. G. Valeeva states in her article, the adequacy of the translation involves its compliance with the expectations of the participants of communication: the creator of the original, the recipient of the translated text, and the translator himself (as cited in Карпенко, 2017).

Preservation of the functional-communicative orientation in the translated text is a general feature of adequacy and equivalence and requires the translator to know and study these concepts. In addition to the above, there is also a pragmatic problem of translation. According to V. N. Komisarov, the pragmatic aspect or pragmatic potential of a text is its ability to produce a communicative effect (as cited in Карпенко, 2017).

Accordingly, the translated text should have the same communicative effect on the recipient as the original text. The pragmatic problem of translation is related to the genre features of the original and the type of readers it is aimed at. For example, works of art are mainly addressed to recipients for whom the original language is their mother tongue, but, despite this, they are often translated into other languages. In works of this nature, one can often find descriptions of facts related to national history, everyday life, or customs. This requires making changes on a pragmatic level in order to create the necessary communicative effect on readers.

Sometimes the pragmatic goal of translation is to achieve a certain communicative effect in relation to different groups of recipients. In this case, the translator focuses on the individual characteristics of the recipients of the translation.

The realization of this setting calls for the need for pragmatic adaptation of the text, which goes beyond translation as a process of creating a text that is communicatively equivalent to the original. The problems of general translation are reflected in scientific and technical translation, which is a subdivision of the science of translation and has its own specificity.

Technical translation is a whole science that arose on the basis of the synthesis of linguistics and technology. There is no generally accepted definition of NTP. According to I. D. Lyutkin, scientific and technical translation is a complex complex of various mental, psychological, and physical actions of the translator, which require, at a minimum, the basics of encyclopedic knowledge (Коваленко, 2001). V. P. Smekaev gives the following definition: “Technical translation is the expression in written or oral form of special scientific and technical information that has already been expressed in another language, using the means of another language” (as cited in Кочерган, 2005).

The borders of the NTP region are very wide, and it is almost impossible to define them. This includes the translation of the following types of materials, literature and documentation: monographs, scientific and popular articles and reports, essays, annotations, reviews, references, technical descriptions of equipment, operating instructions, repair manuals, service manuals, etc. NTP also includes the translation of narrowly professional scientific and technical texts and documents, for which, in addition to knowledge of a foreign language, consultation and the involvement of technical specialists, engineers, IT specialists, equipment adjusters and other specialists in a narrow field are necessary. According to S. M. Gorelikova, there is no longer any doubt that the study of terminology issues should be carried out both by linguists and by representatives of the relevant branches of science and technology (as cited in Кочерган, 2005).

The main type is a full written translation, but others are its abbreviated versions. V. P. Smyekaev examines the abridged translation in more detail in the form of an abstract or annotation.

Referential translation is a written translation of certain parts of the original, selected in advance and logically connected into a single material. Referential material is always shorter than the original text, because secondary information is excluded during the translation process. Annotated translation is a type of technical translation that involves writing the instructions of the original in another language. The purpose of the instructions is to give a brief description of the original. This type of translation differs in that it gives the reader an idea of the nature of the original (scientific article, technical description) and its structure (what questions and how they are considered).

Correct translation should be based on the features of scientific literature, which involves the use of a scientific style of speech, and which consists of several components: actual scientific texts (scientific-technical, scientific-humanitarian, natural sciences), popular science, educational.

Scientific style is a functional style of speaking literary language, which is characterized by a number of features: initial consideration of the statement, monologic form of the story, strict choice of language means, standardized language. In terms of style, genre varieties also differ: monograph, article, essay, textbook, study guide, exercise books, and others. Since the features of scientific and technical translation depend on the features of the translated texts, it makes sense to move on to the definition of the term “text”

A text (“*textus*” – entanglement, connection, structure, connection) is a speech work consisting of a sequence of sentences arranged in a certain order and united into a whole by a common theme, main idea and with the help of various linguistic means. According to the statement, the text is a series of statements related in content, or a separate statement, used independently; it is the texts and statements that act as direct objects of translation. We might follow that in the process of translation, there is a communicative equalization of texts in different languages (Коптілов, 2003).

Technical text is a type of text. Technical text is text full of specialized vocabulary, terminology, and abbreviations that can often have multiple meanings

depending on the field of application. It does not contain stylistic means of presentation of the material, does not accept arbitrary and extended presentation of information; when translating, it requires precise and deep knowledge in the required field.

According to R. F. Pronina, when translating scientific and technical materials, it is necessary to take into account that, although the technical language is part of the national language, uses its lexical and grammatical structure, it is characterized by a certain style that corresponds to the goals and objectives of the content of scientific literature, as well as specificity both in the field of terminology and in the field of grammar (as cited in Дергач, 2004).

The main stylistic feature of scientific and technical literature is the concise presentation of the material and clarity of wording. It follows from this that the main requirement for the language of technical texts is an accurate presentation, description and explanation of facts. The lack of emotional saturation, figurative comparisons, metaphors, elements of humor, irony, and other language turns is also characteristic of scientific and technical language. The material is presented briefly, logically, and at the same time quite fully and with evidence. Examining the lexical features of scientific and technical literature, one can come to the disappointing conclusion that the language of technical literature differs from the language of fiction by the saturation of the text with special terms that are often absent in terminological dictionaries. This is due to the fact that the boundaries of human knowledge are expanding, and, accordingly, there is a need for new definitions of concepts and an expanding vocabulary.

Expansion occurs due to the appearance of new terms. Terms are words that denote special concepts in various fields of science and technology. For their translation, it is important to understand the phenomena and processes discussed in the text, and to know the terminology of the language used to translate. The biggest difficulty is multi-component terms. S. N. Gorelikova mentions two categories of

terms: general scientific and special. General scientific ones express general concepts of science and technology, and special ones express private concepts.

Despite the large number of special terms, commonly used words and combinations are also used in scientific and technical literature. A significant part of commonly used words are polysemous words. Z. Ya. Dokshstein, E. A. Makarova, and Z. Z. Radominova suggest dividing commonly used words into several groups (as cited in Вакуленко, 2015):

1) words used in scientific and technical literature in meanings different from the original ones (to offer in a scientific text is used in the sense of “to provide”, not “to offer”). Separate attention should be paid to polysemous words (the word matter most often means “problem, question” and not “matter”). This group also includes some service words that can perform the functions of different parts of speech (for can be a preposition and a conjunction);

2) words that are studied at the initial stage of education (to regard – to consider, count; to design – to construct);

3) words and phrases that ensure the logic of the presentation (to begin with, furthermore);

4) words used to express the author's attitude to the presented facts (needless to say, in a sense);

5) phraseological phrases that are neutral in coloring in scientific and technical texts (to be under way, to bring into action).

These features are explained by the need to argue scientific facts. In addition to complex sentences, scientific style texts are characterized by the presence of monosyllabic sentences or sentences with homogeneous members, which focus the reader's attention on important facts and provisions. Another feature of scientific and technical literature can be called its nominative character, which is manifested in the predominance of nominal structures. It follows that such texts rarely contain full-valued verbs in individual forms.

1.2. FEATURES OF TECHNICAL TEXT TRANSLATION (TYPICAL TRANSLATION TRANSFORMATIONS)

Working with scientific and technical texts, the translator faces a number of problems. To competently solve such problems, the translator must, first of all, have a broad perspective. According to V. P. Smekaeв, most often the translator of technical texts has to deal with new information in various fields of science and technology or, if necessary, compare new information with the existing information in this field. Depending on the practical value and further use, this information may be processed differently by the translator. A translator must be able to handle all types of primary information processing, but at the same time have a certain amount of special knowledge, in addition to a good command of a foreign language. It was singled out as a problem in the translation of technical texts as the problem of translatability and adequacy (as cited in Д'яков, 2000).

Scientific and technical terminology (STT) is one of the most complex and important aspects of science and technology in general and scientific and technical information in particular. The value of the text depends on the accuracy of the term and its translation into another language.

The difficulties of working with technical terminology are based on the fact that its limits are very large, and no translator can know all the terms. Also, NTT is constantly developing, but the pace of publishing dictionaries with new terms always lags behind, which greatly complicates the translator's work and creates additional work for him.

Another problem related to terminology is the lack of unification of terms, as well as the use of narrowly professional vocabulary by specialists, which is often incomprehensible to other specialists. We stress that the inaccurate translation of terms often leads to such serious consequences as deterioration of the translator's reputation and delay in the implementation of important translation projects (Д'яков, 2000).

In addition, technical texts contain persistent, loose phrases. In translation it is important to translate rare phraseologisms that we can find in the scientific text, as the bulk of phraseological units in these texts are phraseological units-terms, which are the main element of any scientific article (Матківська, 2013, p. 56). Phraseologisms in their original meaning and as a means of imagery in a scientific text are unacceptable, as any source of ambiguity in scientific style texts.

Technical text translation involves a series of intricate transformations to ensure that the essence and functionality of the original document are preserved while adapting it for a new audience or language. One prominent feature of technical text translation is the necessity for accuracy. Translators must meticulously translate technical terms and concepts to maintain the integrity of the content. This often involves extensive research and specialized knowledge in both the source and target languages, ensuring that every detail is conveyed with precision. Moreover, technical translation requires a keen eye for detail, as even minor errors or mistranslations could have significant consequences in fields such as engineering, medicine, or law.

Another crucial aspect of technical text translation is clarity. Beyond accurately translating the content, translators must ensure that the translated text is clear and comprehensible to the intended audience. This may involve simplifying complex language or restructuring sentences to enhance readability without sacrificing accuracy. In technical manuals or instructional documents, clarity is paramount to ensure that users can easily understand and follow the instructions provided. Additionally, maintaining consistency is essential throughout the translation process to avoid confusion and ensure a seamless reading experience for the audience.

Cultural adaptation is also a fundamental feature of technical text translation. Translators must consider cultural nuances and preferences when translating technical documents for different regions or audiences. This includes adapting measurement units, adhering to local regulations, and using language that resonates with the target audience. By integrating cultural elements into the translation, translators can enhance the relevance and accessibility of the content, ultimately facilitating better

communication and understanding across cultural boundaries. Overall, the features of technical text translation highlight the meticulous attention to detail, linguistic expertise, and cultural sensitivity required to deliver accurate, clear, and culturally relevant translations in technical fields.

In conclusion, technical text translation presents a myriad of challenges that demand a comprehensive approach from translators. They must navigate the complexities of scientific and technical terminology while also grappling with the evolving nature of language and the constant influx of new information. The translator's task extends beyond mere linguistic proficiency; it requires a deep understanding of the subject matter and the ability to convey complex concepts accurately across languages.

The importance of precise terminology cannot be overstated, as inaccuracies can have far-reaching consequences, from impeding comprehension to compromising the integrity of scientific discourse. Moreover, the lack of standardization in technical terminology and the prevalence of specialized jargon further complicate the translation process, underscoring the need for meticulous attention to detail.

Additionally, the presence of idiomatic expressions and phraseological units in technical texts poses a unique set of challenges for translators. Ensuring that these linguistic elements are accurately rendered without sacrificing clarity is essential for maintaining the integrity of the text.

In light of these challenges, translators must possess not only linguistic expertise but also a deep understanding of the subject matter and the context in which the text is situated. Furthermore, they must remain vigilant in keeping abreast of developments in both language and technology to deliver translations that are both accurate and effective.

Ultimately, the successful translation of technical texts hinges on the translator's ability to bridge linguistic and cultural divides, facilitating the exchange of knowledge and advancing scientific discourse on a global scale.

Conclusions to Chapter 1

In the exploration of technical text translation from English to Ukrainian within the Ukrainian linguistic tradition, Chapter 1 delves into fundamental theoretical principles and practical challenges inherent in this specialized field.

Beginning with the classification of technical translation, types, and functions, it becomes evident that the evolution of technology necessitates the dissemination of scientific and technical information across linguistic boundaries. Yet, amidst this growing demand, the definition and categorization of translation itself remain subjects of ongoing debate, reflecting the multifaceted nature of translation studies.

Moving on to the features of technical text translation, the chapter highlights the myriad challenges faced by translators, from navigating complex terminology to preserving the integrity of idiomatic expressions and phraseological units. The accurate translation of technical terminology emerges as a critical concern, given its pivotal role in conveying precise meaning and facilitating effective communication within scientific discourse.

In conclusion, technical text translation stands as a vital conduit for global knowledge exchange, fostering collaboration and innovation in science and technology. However, the effective translation of technical texts necessitates a holistic approach, wherein translators combine linguistic expertise with specialized knowledge and a keen awareness of cultural nuances. By bridging linguistic divides and facilitating the exchange of knowledge, technical translators play a pivotal role in advancing scientific discourse and driving progress on a global scale.

CHAPTER 2. APPLICATION OF TYPICAL TRANSLATION TRANSFORMATIONS IN TECHNICAL TEXTS

This work includes a study of the translation of texts in such a subject area as modeling measurement systems. This area was chosen because measurements are one of the main ways people study nature. In society, science and industry cannot exist without measurements.

A large number of measuring operations are carried out every moment in the world, the results of which are used to ensure the necessary quality and technical level of products, to ensure the safe operation of the transport system, to make medical and environmental diagnoses, and other equally important purposes. Information about measuring operations carried out in a specific country is transferred to other countries by means of translation of relevant documents. Thus, the high-quality translation of texts in the subject field of modeling of measurement systems makes a significant contribution to conducting global research on this topic.

2.1. TRANSLATION ANALYSIS OF TRANSLATION TRANSFORMATIONS FROM ENGLISH TO UKRAINIAN LANGUAGE

In our work, we will consider the translation of scientific texts from Ukrainian to English, since Ukraine actively cooperates with other countries and participates in the joint development of scientific and technical programs (for example, in the field of space exploration). The development of trade relations also requires special attention to measurement information, which is the main object of exchange in the collective solution of scientific and technical tasks and problems and the basis of calculations in the implementation of trade operations.

What is important, scientists need help in compiling dictionaries on this topic, since in our country modeling of measurement systems is a little-studied field, the aspects of its translation into English require detailed study. Therefore, the translation

of the materials of this field into English, which is an international language, will create an opportunity for the unification of measurement methods and means and mutual recognition of measurement results.

The lexical composition of the analyzed corpus of texts is directly related to the mathematical apparatus and terminology related to the narrow field of measuring systems. For example, words such as equation, variable, ratio, expression, coefficient, function, parameter are used due to the large number of different calculations made in the research papers. Along with mathematical terms, you can also find a significant number of formulas and schemes.

This section emphasizes the significance of translating scientific texts from Ukrainian to English, particularly in the under-researched area of measurement systems modeling. As Ukraine collaborates internationally, especially in fields like space exploration, accurate translation is critical for the exchange of scientific and technical information and the unification of measurement methods. The specialized nature of the content, which includes extensive mathematical terminology and formulas, underscores the need for translators to have both linguistic proficiency and technical expertise.

The development of specialized dictionaries is also highlighted as essential for supporting these translation efforts and ensuring that measurement results are universally recognized and understood.

2.2. TRANSLATION OF COMPLEX ONE-WORD AND MULTI-COMPONENT TERMS

Environmental texts from National Geographic magazines are used as sources of factual material. 50 English and 50 Ukrainian terms are considered.

Structural analysis of ecological terminology showed that:

1) environmental terms are divided into four groups: simple terms consisting of one word: *climate/кlimaм*; derived terms formed by affixation: evaporation = e +

vapor + tion / випаровування; compound terms that are formed by adding two bases: *agroecology = agro + ecology / агроєкологія = агро + екологія*; терміни are phrases consisting of two or more words, which are created by adding to a term denoting a generic concept, which specify features in order to obtain specific concepts related to the original: *ground water = ground + water / ґрунтова вода = ґрунтова + вода* (in this example, the term water is used as the basis for the term ground water);

2) the most important among the English environmental terms and their corresponding Ukrainian terms are the phrase–terms with the attributive connection “adjective + noun”, for example: *natural gas / природний газ, industrial waste / промислові відходи*;

3) When translating ecological terminology from English to Ukrainian, the structure of the terms may change, for example: the complex term biodiversity is rendered as біологічна різноманітність – the word–phrase with the attributive link “adjective + noun”, the word–phrase carbon dioxide with the attributive link “noun + “ is transmitted as вуглекислий газ – term–phrase with the attributive connection “adjective + noun”;

4) among the terms-phrases in English ecological terminology, there are neologism terms that are formed, like their corresponding Ukrainian terms, as a result of metaphorical transfer: *Green revolution / Зелена революція, light pollution / світлове забруднення*.

As a result of the etymological analysis, it was established that the main methods of formation of English and corresponding Ukrainian environmental terms are borrowings from Greek and Latin languages, for example: the term *methane* is of Greek origin, the corresponding Ukrainian term *метан* – also Greek; *nermin pesticides* is of Latin origin, as is the corresponding Ukrainian term *пестициди*.

The influence of common Germanic roots in English environmental terminology is also indicated, for example: *drought* (proto-Germanic), *rain* (proto-Germanic), and correspondingly common Slavic roots, for example: *носуха, дощ*.

The analysis of the English-Ukrainian translation of environmental terminology showed that the main way of translating simple, derived, complex terms and phraseological terms is to search for equivalents in the Ukrainian language, for example: *climate* / *клімат*, *evaporation* / *випаровування*, *agroecology* / *агроекологія*, *ground water* / *грунтова вода*.

Tracing can be used when translating terms–phrases (literal translation): *toxic materials* / *токсичні речовини*, *descriptive translation: agricultural pollution* / *забруднення навколишнього середовища синтетичними добривами*, зокрема *concretization: fossil fuels* / *вугілля, нафта, газ*.

In the structural aspect, the terminology in the field of “Electronics”, which is highlighted in the “Aurorange Digital Multimeter” manual, can be considered, firstly, based on the number of components of the term, and secondly, based on the way the terms are formed.

In the first classification, two groups of terms are distinguished: word terms and phrase terms.

The ratio of terms-words and terms-phrases within the selected terms from the manual “Aurorange Digital Multimeter” is practically the same.

Example: Engl. *After connecting test leads across two sides of the capacitor under measurement, be sure that the capacitor has been discharged fully* (AUTORANGE DIGITAL MULTIMETER, 2020).

Укр. *Після підключення тестових проводів до вимірюваного конденсатора переконайтеся, що конденсатор повністю розряджений* (переклад наш).

The term *capacitor/конденсатор* expresses value only in token. In this it is characterized by ambiguity.

Engl. *Application of all areas of safety and operation instructions to ensure that the meter is used specifically and is fixed in good operation* (AUTORANGE DIGITAL MULTIMETER, 2020).

Укр. *Застосування всіх сфер техніки безпеки та інструкцій з експлуатації, щоб гарантувати, що лічильник використовується спеціально та зафіксовано в належному стані* (переклад наш).

The term *meter/лічильник*, when used without specification, is ambiguous. In the field of “Electronics” it reflects the general name of any electronic device. By structure, it is a one-word term.

Example:

Engl. *Average, calibrated in RMS of sine wave* (AUTORANGE DIGITAL MULTIMETER, 2020).

Укр. *Середнє, відкаліброване в середньоквадратичному синусоїдальному* (переклад наш).

The term *sine wave/ синусоїда* is a combination of two nouns that reflect the meaning of “sine wave” (a sinusoidal oscillation of voltage or current).

Phrase terms are more clear and specific than word terms. Therefore, they allow displaying more accurate information than single token terms. On the other hand, most word terms are unambiguous, as we discovered earlier. Therefore, the dominance of terms–phrases in the term system of the field of “Electronics” does not occur.

Next, we will consider the main feature of the terminology of the “Electronics” industry.

Abbreviation involves reducing terms to initial letters or syllables in order to save time and space in the instructions. This method of formation of terminology in the field of “Electronics”.

Example:

Engl. *Always be careful when working with voltages above 60V DC* (Корунець, 2003, p.151).

Укр. *Завжди будьте обережні під час роботи з напругою понад 60 В постійного струму* (переклад наш).

In this example, you can find two abbreviations: V – a commonly accepted abbreviation for volt (Engl. *volt* – Ukr. *вольт*) and DC – another commonly accepted abbreviation in the field of “Electronics” for the short nomination of direct current. (Engl. *direct current* – Ukr. *постійний струм*).

This meter is a portable professional measuring instrument with large LCD and back light for easy reading (Коптілов, 2003, р. 19).

Цей лічильник є портативним професійним вимірювальним приладом із великим РК-дисплеєм і підсвічуванням для легкого зчитування. Ukr. (переклад наш).

The abbreviation LCD is formed in an initial way from the word combination liquid-crystal *display/рідко-кристалічний екран* with the purpose of a short nomination of a liquid crystal (LC) screen.

Engl. *This is fully cosine corrected for angular incidence of light* (Вакуленко, 2015, с. 154).

Ukr. *Це повний косинус з поправкою на кут падіння світла* (переклад наш).

The lexeme *cosine/косинус* is a composite abbreviation of the words complement and sine for the purpose of cosine nomination.

Thus, we follow another type of technical terms are abbreviations seen illustrations in examples of abbreviations:

Engl. *GPS (Global Positioning System)* (Karaban, 2004, р. 387).

Ukr. *Глобальна система позиціонування* (ibid).

This abbreviation is formed from the initial letters of the term “Global Positioning System,” which is a satellite-based navigation system used to determine precise location anywhere on Earth. It's commonly used in navigation devices and applications.

Engl. *ICU (Intensive Care Unit)* (Karaban, 2004, р. 387).

Ukr. *Інтенсивний відділ лікування* (ibid).

This abbreviation stands for “Intensive Care Unit,” which is a specialized department in a hospital providing intensive care medicine to patients who are critically ill or injured. It's commonly used in medical contexts.

Engl. *IPEG (Joint Photographic Experts Group)* (Karaban, 2004, p. 387).

Ukr. *Група експертів з фотографії* (ibid).

This abbreviation represents the “Joint Photographic Experts Group,” which is the name of the committee that created the JPEG standard for image compression. It's commonly used in the context of digital images and photography.

Engl. *LED (Light-Emitting Diode)* (Karaban, 2004, p. 387).

Ukr. *Світлодіод* (ibid).

This abbreviation is formed from the initial letters of “Light-Emitting Diode,” which is a semiconductor light source that emits light when current flows through it. LEDs are commonly used in various lighting applications.

Engl. *NASA (National Aeronautics and Space Administration)* (Karaban, 2004, p. 387).

Ukr. *Національне управління авіації та космічних досліджень* (ibid).

This abbreviation stands for the “National Aeronautics and Space Administration,” which is the United States government agency responsible for the nation's civilian space program and for aeronautics and aerospace research. It's well-known in the context of space exploration.

Engl. *NGO (Non-Governmental Organization)* (Karaban, 2004, p. 387).

Ukr. *Неприбуткова організація* (ibid).

This abbreviation represents “Non-Governmental Organization,” which is a non-profit organization that operates independently of any government. NGOs are often involved in humanitarian, environmental, and social causes.

Engl. *PIN (Personal Identification Number)* (Karaban, 2004, p. 387).

Ukr. *Персональний ідентифікаційний номер* (ibid).

This abbreviation is formed from the initial letters of “Personal Identification Number,” which is a numeric or alphanumeric code used for authentication or access control. It's commonly used in the context of banking, security systems, and personal devices.

In conclusion, the translation of complex environmental terms from English to Ukrainian requires a nuanced and precise approach. Analyzing the structure of terms—simple, derived, compound, and phrase-based—helps in maintaining accuracy and contextual relevance. Key challenges include adjusting term structures and incorporating metaphoric expressions and borrowings from Greek and Latin, which enhance the lexical depth.

The findings emphasize the importance of linguistic accuracy and contextual appropriateness in scientific translations, where term accuracy is crucial for understanding and application. This study underlines the complex interplay between language structure, etymology, and usage, highlighting the need for expert translation practices in environmental terminology. This provides a foundation for further research and practical applications in ensuring consistent and universal scientific communication.

2.3. TRANSLATION OF THE NOUN MODELS

In our research, we focus on the translation of prepositional groups because they are multi-component and multi-meaningful. There are a lot of different terms models: one word term model, the second is two word term model, similar to part-of-speech model which is popular in analysis as Karaban (2004) who discovered this term models which we trace as the N+N model (p. 387).

Often have multi-words term models (Engl. *carried based structures* – Ukr. Несучі базовані структури) should be traced as field-specific terms, as they are regarded also as Participle + Noun models (Karaban 2014, p. 396-403).

Sometimes the Partciple+Noun models can be translated by sentences: Engl. *the United Nations sponsored equipment* – Ukr. *Обладнання, спонсороване ООН* (переклад наш).

1. Rock shaped

Now we have a lot of multi-component terms in technical translation as that I can be traced as acronyms (Karaban 2014, p. 399).

2. SLBM launched ballistic missile

3. IRDM intermediate range ballistic missile

4. TBM Tactical ballistic missile

Technical terms abbreviations have certain unchanged components as x-component (Contributors to Wikimedia projects, 2022), for instance x, cf.: Engl. *x-ray* – Ukr. *рентгенографія*, Engl. *X-AFP* – Ukr. *розширений альфа-фетопротеїн*, *XRTadiotherapy used in cancer treatment* – Ukr. *Рентгенотерапія, яка використовується для лікування рак*.

Compound terms (e.g. *Doppler Effect* – Ukr. *Ефект Доплера*) with antroponomic component are often found as technical terms (Karaban 2014, p. 405).

We find the possible to follow the tradition in translation for rendering such elements:

- Johnson & Johnson – Джонсон і Джонсон
- McDonald's – Макдональдз
- Ford Mustang – Форд Мустанг
- Louis Vuitton – Луї Віттон
- Walt Disney – Уолт Дісней

We find interesting other popular models as the technical terms can bear some stable components with -ing (Karaban 2014, 402).

As we follow in translations we find many examples with this component, for instance:

Engl. *harmless looking object* – Ukr. *нешкідливий на вигляд предмет* (переклад наш).

- Fiery looking
- forward-looking
- Odd looking object
- Backward looking
- primitive looking
- forward-looking
- side looking
- inward looking

Another model we deal with is **Abbreviation term model**.

2.4. Translation of the abbreviation and term models

The popular translation model is **abbreviation term model** which we find in our analysis. In scientific texts it is important to follow abbreviations that present of facts and data in the comprised form.

We followed the terms extracted from technical text, many terms are must have knowledge of the translator, for instance terms that are names of chemical elements, e.g.:

Engl. *Nitrogen dioxide from car exhausts can be the actual chemistry of allergens* (Коваленко, 2001, р.38).

Ukr. *Діоксид азоту з вихлопних газів автомобілів може бути справжньою хімією алергенів* (переклад наш).

Engl. *Nitrogen dioxide from the exhaust pipe of a car can change the chemical composition of allergens* (Коваленко, 2001, р.38).

Ukr. *Діоксид азоту з вихлопної труби автомобіля може змінити хімічний склад алергенів* (переклад наш).

Engl. *Pollutants that are directly emitted into the atmosphere are primary pollutants such as sulphur dioxide (SO₂), some nitrogen oxide (NO_x) air pollutants, consisting of nitric oxide (NO) and nitrogen dioxide (NO₂), carbon monoxide and particulate matter (PM) while secondary pollutants that form in the air as a result of chemical reactions with other pollutants and gases include ozone (O₃), NO_x, and some particulates (Zhang et al., n.d.) (Коптілов, 2003, с.98).*

Укр. *Забруднюючі речовини, які безпосередньо викидаються в атмосферу є основними забруднювачами, такими як діоксид сірки (SO₂), деякі оксиди азоту (NO_x) забруднювачі повітря, що складаються оксиду азоту (NO) і діоксиду азоту (NO₂), вуглецю монооксиду та твердих частинок (ТЧ) у той час як вторинні забруднюючі речовини, що утворюються в повітрі в результаті хімічних реакції з іншими забруднювачами та газами включають озон (O₃), NO_x і деякі частинки (переклад наш).*

In this case the translator should follow the translation of terms that is important part of self education process.

Term models are important as we find abbreviations that give precise information in the field areas, such as chemistry, automobile industry and many other technical spheres. The verb may in this example expresses a risky situation (a subcategory of possibility). This is an objective possibility, but the author here expresses his concern. The verbs must, have (to), need (to) express their typical meaning of obligation and need. The verb must is usually used in the sense of advice, recommendation, but sometimes it can express the meaning of obligation in a milder form compared to the verb must.

Until then, those who suffer from airborne allergies will have to put up with the sniffles.

In this case, the verb have (to) expresses the modal meaning of necessity due to the circumstances, and is translated as follows: Until then, those who suffer from airborne allergens will have to put up with undead.

In conclusion, the translation of the terminology involves understanding and effectively conveying the nuances of transfer in popular science articles. These translations play a crucial role in possibility of conveying the information presented. Translating abbreviations accurately is essential for preserving the intended meaning of the original text in the target language. Thus, a nuanced understanding of abbreviations in popular science articles is vital for achieving accurate and effective translation results.

Conclusions to Chapter 2

In general, we can say that emotionality is not inherent in the principle of the language of science, but it is possible in it depending on the topic or nature of the work. Yes, the humanities are more prone to emotional presentation than accurate. A higher degree of emotionality is natural in polemics and popular science literature. Much, finally, depends on the individuality of the knowledge of a translator and his or her thesaurus.

Figurative expressiveness occurs mainly in the creation of new terms: at first, a figurative term is later fixed in terminology and, after receiving a definition, becomes the direct name of a scientific concept.

CONCLUSIONS

The relevance of our research is explained by the small number of studies on the translation of texts in the field of modeling of measurement systems and the need to identify the characteristic features of the translation of these texts, which will help both specialists and translators in this field. We analyzed the aspect of translation from Ukrainian to English. The purpose of our work was to identify, study and describe the peculiarities of translation of texts in the field of modeling of measurement systems. In the theoretical section, we considered the main concepts of our research, the general features of technical texts, the difficulties of their translation, and the resources of a technical translator.

We found out that for a correct translation it is necessary to take into account the lexical order and grammatical structure of the technical text, because they cause translation problems. For study, we chose the area of modeling of measurement systems, taking into account the importance of measurement operations in science and industry and, therefore, the need to compile dictionaries on this topic.

We might include different terms models: one word term model, the second is two word term model, multi-words term models. The noun models are multi-component terms which have different part-of-speech schemes.

Another important layers is technical terms abbreviations and compound terms with some stable components – antroponimic or *-ing* component for instance.

In conclusion, we can say that we have achieved the goal of the research and confirmed the hypothesis that scientific texts in the subject field of measurement system modeling have a certain specificity. In the future, following our example, it is possible to study the peculiarities of the translation of scientific texts of other subject areas.

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РЕЗЮМЕ

Курсову роботу присвячено дослідженню способів перекладу технічних текстів. У ході роботи висвітлено основні етапи наукової думки в галузі перекладу, описано існуючі способи перекладу термінів технічних текстів, проаналізовано зразок тексту і здійснено перекладацький аналіз фактичного матеріалу дослідження.

Ключові слова: переклад, перекладацький аналіз, термін, технічні тексти, перекладацькі трансформації.

ANNEX A

№	Оригінал	Переклад	Перекладацька трансформація
	climate	Клімат	Дослівний переклад
	evaporation	Випаровування	Описовий переклад
	agroecology	Агроекологія	Дослівний переклад
	ground water	<i>грунтова вода</i>	Дослівний переклад
1.	natural gas	Природний газ	Дослівний переклад
2.	industrial waste	Промислові відходи	Описовий переклад
3.	biodiversity	Біологічна різноманітність	Описовий переклад
4.	carbon dioxide	Вуглекислий газ	Конкретизація
5.	Green revolution	Зелена революція	Дослівний переклад
6.	light pollution	Світлове забруднення	Дослівний переклад
7.	methane	Метан	Дослівний переклад
8.	toxic materials	Токсичні речовини	Дослівний переклад
9.	<i>fossil fuels</i>	Вугілля, нафта, газ	Конкретизація
10.	agricultural pollution	забруднення навколишнього середовища	Описовий переклад
11.	After connecting test leads across two sides of the capacitor under measurement, be sure that the capacitor has been discharged fully.	Після підключення тестових проводів до вимірюваного конденсатора переконайтеся, що конденсатор повністю розряджений.	
12.	Application of all areas of safety and operation instructions to ensure that the meter is used specifically and is fixed in good operation.	Застосування всіх сфер техніки безпеки та інструкцій з експлуатації, щоб гарантувати, що лічильник використовується спеціально та	

		зафіксовано в належному стані.	
13.	Average, calibrated in rms of sine wave.	Середнє, відкаліброване в середньоквадратичному синусоїдальному.	
14.	Always be careful when working with voltages above 60V DC.	Завжди будьте обережні під час роботи з напругою понад 60 В постійного струму.	
15.	volt	Вольт	Дослівний переклад
16.	direct current	постійний струм	Описовий переклад
17.	This meter is a portable professional measuring instrument with large LCD and back light for easy reading.	Цей лічильник є портативним професійним вимірювальним приладом із великим РК-дисплеєм і підсвічуванням для легкого зчитування.	
18.	meter	Лічильник	Конкретизація
19.	capacitor	конденсатор	Описовий переклад
20.	sine wave	Синусоїда	Конкретизація
21.	liquid–crystal display	рідко-кристалічний екран	Описовий переклад
22.	This is fully cosine corrected for angular incidence of light.	Це повний косинус з поправкою на кут падіння світла.	
23.	cosine	Косинус	Дослівний переклад

ANNEX B

№	Оригінал	Переклад
	GPS	Глобальна система позиціонування (Global Positioning System)
	ICU	Інтенсивний відділ лікування (Intensive Care Unit)
	JPEG	Група експертів з фотографії (Joint Photographic Experts Group)
	LED	Світлодіод (Light-Emitting Diode)
1.	NASA	Національне управління аеронавтики та космічних досліджень (National Aeronautics and Space Administration)
2.	NGO	Неприбуткова організація (Non-Governmental Organization)
3.	PIN	Персональний ідентифікаційний номер (Personal Identification Number)
4.	RSVP	Будь ласка, відповідь (Please respond)
5.	UFO	Невідомий літаючий об'єкт (Unidentified Flying Object)
6.	VIP	Дуже важлива особа (Very Important Person)
7.	VPN	Віртуальна приватна мережа (Virtual Private Network)
8.	CEO	Головний виконавчий директор (Chief Executive Officer)
9.	DIY	Зроби це сам (Do it yourself)
10.	ETA	Приблизний час прибуття (Estimated Time of Arrival)
11.	FAQ	Часті питання (Frequently Asked Questions)
12.	CVO	Головний візіонерний директор (Chief Visionary Officer)
13.	HR	Кадри (Human Resources)

14.	COO	Головний оперативний директор (Chief Operating Officer)
15.	CSO	Головний офіцер з безпеки (Chief Security Officer)
16.	CSS	Каскадна таблиця стилів (Cascading Style Sheets)
17.	DOM	Модель об'єктів документа (Document Object Model)
18.	HTML	Мова розмітки гіпертексту (Hypertext Markup Language)
19.	PHP	Гіпертекстовий препроцесор (Hypertext Preprocessor)