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CLASSIFICATION OF ERRORS
IN RUSSIAN-ENGLISH TRANSLATIONS
OF SCIENTIFIC ARTICLES IN PHYSICS

The article considers some of the most common mistakes in the Russian-English translations of technical reports and scientific articles made by the authors writing in English as a foreign language. From year to year, the number of publications by Kazakhstani scientists in the English-language journals, where articles should be submitted in English, is growing. Therefore, a very important problem facing teachers of the English language is to teach students of engineering specialties, future scientists, how to write articles in English at such a level that they are not rejected by the editors of the English-language journals. Therefore, the students must achieve a level of English proficiency not lower than B2. The authors of this article consider the use of machine translations as a way of forming correct translations of scientific texts. There is an ambiguous attitude of various authors to the use of machine translations in the process of teaching English. The authors of this article believe that the proper use of machine translations is a useful tool in teaching translation of scientific texts. Students learn to understand the meaning of the correct use of terms in translation and their ambiguity, get acquainted with the sources of errors and ways to correct them. The authors consider the most common mistakes in Russian-English translations of technical texts – incorrect use of terminology, violation of the presentation logics, word-for-word translation and give recommendations for their correction.

Key words: translation of scientific-technical texts, machine translation, terminology, grammar mistakes.

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Физика пәні бойынша ғылыми макалалардың
орысша-ағылшынша аудармаларының қателерді жіктеу

Мақала авторлары ағылшында жазылған техникалық бағдарламалар мен ғылыми макалалардың аудармаларының ең кем дегенде ағылшын пәнінен В2 дәстүрлі. Олардың білікті мамандығын отырып, аударманың және оның жұмыс істеу қызметінен ғана таңдаған. Бұл таңдаған аудармалардың аудармаларының ортақ басқармасының ең таңдаған бір мәселенің бейнелендірілуін өтеді. Бұл ақырындағы аудармаларға және оның барлық қателерін анықтау үшін қызметін арқау ете отырып, аудармаларының қателерін дәлілді аударма материалдарын анықтау үшін қолданылады. Аударма дұрыс пайдаланылуы ғылыми және техникалық тәжірибелердін бойынша қорытынды ұсынылады.

Түйін сөздер: ғылыми-техникалық мәтіндердің аудармалары, білімділік, дәстүрлі сөздік, машиналық, терминология, олым, техникалық, қателер.
Introduction

The problem of mistakes in the Russian-English translations of technical reports and scientific articles made by the authors writing in English as a foreign language is not new and seems to have an easy solution in finding an English editor and signing a contract on translating/editing the text. However, nowadays many of the scientists submitting their manuscripts to the English-language journals do not have an opportunity to find such a translator. Therefore our task is to teach students to comply with such a task with a minimum number of mistakes and help them to prepare drafts of manuscripts.

For this purpose, it is necessary to consider the main sources of mistakes in the manuscripts submitted for publication.

Today, to make the results of research known to the world scientific community, scientists have to publish their scientific articles in the English-language journals, and hence have to write them in English. On the way to perfection of their writing they have to overcome a lot of lexical and grammatical problems. In addition, they have to know the scientific style of English scientific articles, to understand the important role of correct use of terminology and construction of sentences. Therefore, a lot of effort should be made to make our texts translated into English to sound more English than they often do now. To be able to translate technical texts at a rather high level one must be a scientist, or engineer, a linguist and a writer.

When two languages, as it is the case of Russian and English, have different syntactic and lexical structures, very often it is necessary to change the structure of sentences. Russian, as a highly inflected language can have long chains of nouns, which the translator stumbles upon in writing a translation. It becomes necessary to paraphrase such sentences and only then translate them. The translator must always keep in mind that there are no little things in translation, and he/she must be attentive to tiny details, as they may be of primary importance. Scientific translation is always a set of problems which must be solved to get the result. Analyzing the translation errors we must find out their sources and learn how to avoid such errors.

Experimental part

The most common translation errors are the incorrect use of terminology, grammar mistakes and stylistic defects. A very important place among translation errors is occupied by the errors in terminology, very often it is general scientific terms.

Though these sources of mistakes are well-known, the translators stumble upon them again and again. Here we will consider different types of errors...
in scientific texts because of which Russian-English translated articles are not accepted by the English-language journals. Let us first consider mistakes in terminology in physical texts, some of which have been repeatedly discussed, however, they are made again and again. Therefore, it is necessary to consider such terms as “value” and “quantity”, “resistor” and “resistance”, “facility” and “device”. They are very often misused, which sometimes makes the sentence hardly understandable. The importance of studying collocations of scientific terms and usage of special patterns such as atomic absorption spectrophotometry, nuclear magnetic resonance, chromatographic techniques, etc. was pointed out by S.M. Kapina (S.M. Kapina, 1977: 30).

Let us consider the following examples of incorrect translations and their corrections:

**Incorrect:** The material is preliminarily subjected to intensive mechanical treatment in pumps, auxiliary equipment, in the elements of local resistances, etc.

**Correct:** … intensive mechanical treatment in pumps, auxiliary equipment, in the elements of local resistors.

In the English language “resistance” is the measure of the degree to which a conductor opposes an electric current through that conductor, whereas “resistor” is a device designed to increase the ability of an electric circuit to stop the flow of an electric current through it. Therefore, the mistake is quite obvious. Such a mistake is usually made by the low qualified translators.

Now let us consider the difference between “value” and “quantity”. It is very important for correct translation of the Russian term "величина". Here are some examples.

**The Russian sentence:** Если имеют в виду величину во втором смысле, то к названию величины добавляют название объекта, который величина характеризует, или слово “конкретная”.

**Incorrect translation:** If we mean the value in the second sense, the name of the object that characterizes the _value_, or the word “specific” is added to the name of the _value_. (Google.translation.com)

**The Russian sentence:** “Методы и средства измерения и контроля динамических величин” is translated as “Methods and means of measurement and control of dynamic values.”

In the above examples we have errors, which make the sentences not understandable. The problem is that in the Russian language the words “value” and “quantity” are often translated by the same word “величина” in English “value” means “величина, значение”, which is often misinterpreted in translations. For example A.L. Pumpyansky (A.L. Pumpyansky, 1965: 28) gives the following translations of word “величина” – _value_, _size_, _magnitude_, _quantity_, _amount_, _intensity_. Therefore it is often difficult to choose the correct term if it is not given in the dictionary.

One more example of the proper use of the term _value_: It should be noted that for both limiting sections, the values of μ₀ and μ are real viscosity characteristics of non-Newtonian fluids (Askarova, 2017: 14).

Let us consider a widely used Russian phrase “найти практическое применение”. It seems quite natural to translate it as “to find practical application”. However, the use of the Russian-English dictionary gives “to have practical application”. The refore the sentence “Результаты этой работы могут найти практическое применение в таких областях, как отделение и удаление частиц пыли из плазменного кристалла.” should be translated as “The results of this work can _have practical application_ in such areas as separation and extraction of dust particles from the plasma crystal.” Two more examples from the Internet: Does the problem of infinity have any practical application? It has countless practical applications. The source is: (https://math.stackexchange.com/questions/284982/).

A lot of mistakes are made in translation of the Russian term “устройство”. Below we present an extract from the Russian-English dictionary (AB-BYYLingo. www.lingvo.com).

Устройство 1) (действие) arrangement; organization; для устройства своих дел – to settle one’s affairs, 2) (оборудование) equipment; facilities; (механизм) device; (приспособление) arrangement; аппаратное устройство – hardware device; зарядное устройство аккумулятора – battery charger; 3) structure; (система) system; государственное устройство – state/government system 4) (расположение) arrangement, layout.

In translation of the sentence “Оксид азота (NO), который составляет более 90% от общего количества его оксидов, выделяемых устройствами для сжигания, далее окисляется в атмосфере до NO₂,” the words “устройства для сжигания” were translated as _combustion devices_ whereas it should be _combustion facilities_ and the sentence must be worded as “Nitric oxide (NO), which makes more than 90% of the total amount of its oxides emitted by the _combustion facilities_, is oxidized further in the atmosphere to NO₂.” The other example is translation of “энергосбережение” in the sentence “Компания Digital Group представляет комплексный системный подход в области...”
energosбережения.” The Digital Group offers an integrated system approach in energy conservation. It was translated as energy conservation, which is not energy saving but energy preservation. The correct variant is energy saving.

One more example on savings: the sentence “Если проводимые на предприятии работы по стандартизации не меняют качество выпускаемой продукции, то затраты на их проведение перекрываются экономией сырья” was translated as “If the work on standardization carried out at the enterprise does not change the quality of the products manufactured, the costs of their implementation overlap with the economy of raw materials”, where the word economy was used instead of savings. Here is the example of misuse of the words excitement and excitation.

Incorrect: In the second case, after the preliminary excitement, the plastic properties of the material are retained.

Correct: In the second case, after the preliminary excitation, the plastic properties of the material are retained.

Mistakes arise not only in translation of terms but also in translations of adjectives. For example, the phrase “Такое поведение частиц было в полном закономерном” – “This behavior of the particles was logical” though it would be better to use quite natural. The students must remember that it is often incorrect to copy translations from the other areas of science. For example, for political texts целесообразный could be translated as legitimate but it usually does not work in scientific texts and, in general, this word is often tricky for translation (L. Visson, 2003: 177).

The terms used separately as engineering can change their meaning in collocations, for example, system safety engineering (обеспечение системы безопасности) or industry engineering (организация производства) (Klimzo, 2006:21).

An important feature of English scientific and technical style is a wide use of elliptical constructions, incorrect understanding of which often leads to ridiculous mistakes in the translation (Hutchinson, Tom and Alan Waters. 1987).

Further we will consider some of the most common grammar mistakes, which are encountered in the overwhelming majority of the Russian-English translations.

The first one that must be noted is the wrong use of verbs to allow (to), to permit (to), to enable (to). When it is used to mean make it possible to, allow to cannot be used without a grammatical object, so we cannot say: At present, the statistics available does not allow to take into account all these situations: “allow” needs to be followed by a noun or pronoun such as “us” (the statistics does not allow us to take all these situations into account). There are many cases where this construction is used wrongly. The same is applied to permitto adenable to. Here are some examples of Russian-English translation with the wrong use of this construction.

Incorrect translation: “The studies carried out in the work allowed to determine the basic laws of the distribution of radiation heat in the combustion space and to determine the quantitative values of the heat flow due to radiation in different directions.”

Incorrect translation: “This research enabled to determine the basic laws of the radiation heat distribution in the combustion space and to obtain quantitative values of the radiant heat flux in different directions.

Incorrect translation: “The least square method allows to find the errors of parameters in the linear dependence, which are determined by formulas (20) and (21):”

Incorrect translation: “However, the probability theory allows to calculate the shape of the smooth curve, which is the limit for the histogram in case of an unlimited increase in the number of experiments.”

Incorrect translation: “Variations in the external field allow to control the position of the dust particles in the gas discharge.”

In the above numerous examples, taken from the latest manuscripts, we see the wrong use of the structure allow to and enable to. These errors can be explained by the presence of a similar construction in the Russian language but without a pronoun.

However, grammarmistakes, though they give a large percentage of gross mistakes, as well as the terminological ones, do not cover all the scope of mistakes.

The other part to be considered is stylistic defects in the text, which are subdivided into the following categories:

1) Amorphous sentences (such sentence structure when grammar relations between words become clear only with the consideration of meaning).

Let us consider the following example:
Substances reacting with water (metallic potassium, sodium), not de-energized electrical equipment and calcium carbide are not allowed to extinguish with water due to the possibility of explosion in which acetylene is released.

Water cannot be used to extinguish substances reacting with water (metallic potassium, sodium), not de-energized electrical equipment and calcium carbide as they may explode releasing acetylene.
The whole structure of the sentence was changed to remove the amorphous phrase.

2) Formation of “parasitic” relationships between words (because of incorrect construction of the phrase there seems to be a relation between words, when there is no relation) (Matukihm.http://earchive.tpu.ru/bitstream/11683/36696/1/dx.doi.org-10.1051-matecconf-20179201041.pdf).

It is important not to miss essential information or, on the contrary, to introduce something that is not in the text (or at least in a sufficiently obvious subtext) of the original (Gudova, Poltavskaya, 2016).

A vivid example of such “parasitic” relationships is the translation of the phrase “Высокоскоростные электростатические зеркала вращательной симметрии с временем фокусировки по энергии третьего порядка,” which was translated as “High-speed electrostatic mirrors of rotative symmetry with time flight focusing on third order energy” and can be considered as the mistakes in the wrong translation of terms, for example, “rotative symmetry” instead of “rotational symmetry” and an example in the wrong translation of a chain of nouns. “High dispersive electrostatic mirrors of rotative symmetry with the third order time of flight focusing by energy”.

The Russian structure “фокусировкой по энергии третьего порядка” was incorrectly understood by the translator, therefore we see “third order energy”, though it is focusing of the third or-
der but not energy of the third order. This is a vivid example of wrong translation of chains of nouns in Russian. The other example is: “Кос – коэффициент передачи цепи обратной связи”, which was translated as “circuit transfer feedback coefficient” instead of “the transfer coefficient of the feedback circuit.” When we read circuit transfer feedback coefficient we understand that there is a circuit transfer but not a feedback circuit.

In the textbook Learn to Translate by Translating, Meshkov and Lambert write that the process of translation is a process of making decisions by the translator. Numerous examples of extra words are given in the book. These examples refer to scientific texts: В течение длительного промежутка времени. It is suggested that the translation “for an extended period of time” should be changed for “for a long time”. Another example: “Результатом любого процесса является изменение энергии”. This sentence was translated as “The result of proceeding of any process is a change in energy. The authors suggest a better interpretation as “Any process results in a change in energy” (Meshkov and Lambert, 1997: 112).

### Results and discussion

There are a lot of examples of usage of the expression “the fact that…,” which very often appears in the translations of such Russian phrases as “характерен тем, что…”, “объясняется тем, что…”,
“связано с тем, что …”.

| Text for translation | Variant before correction | Variant after correction |
|----------------------|---------------------------|--------------------------|
| Центробежный метод характерен тем, что чувствительный элемент реагирует на центробежную силу, развиваемую неуравновешенными массами врачающегося вала. | The centrifugal method is characterized by the fact that the sensitive element responds to centrifugal force developed by unbalanced masses of the rotating shaft(https://translate.google.com/). | The centrifugal method is based on the response of the sensitive element to the centrifugal force developed by unbalanced masses of the rotating shaft. |
| Если случайный характер результатов наблюдений связан с тем, что они имеют ошибки измерения, результаты наблюдений имеют нормальное распределение. | If the random nature of the observation results is due to the fact that they have measurement errors, the results of observations have a normal distribution. | If the random nature of the observation results is caused by measurement errors, the results of observations have a normal distribution. |
| Деление погрешностей на основные и дополнительные связано с тем, что свойства средств измерений зависят от внешних условий. | The division of errors into basic and additional is due to the fact that the properties of measuring instruments depend on external conditions. | The division of errors into basic and additional is explained by the dependence of the properties of measuring instruments on external conditions. |
Let us consider some more widely spread mistakes in the Russian-English translation where the adverb is used after to before the infinitive which splits the infinitive (incorrectly used structures and their corrected variants are given in italics).

**Splitting of the infinitive:**

*Incorrect:* Physicochemical purification makes it possible to intensify sharply mechanical purification of sewage.

*Correct:* Physicochemical purification makes it possible to provide sharp intensification of mechanical purification of sewage.

*Incorrect:* Educational monitoring data are used to comprehensively analyze the state of the environment.

*Correct:* Educational monitoring data are used to carry out a comprehensive analysis of the state of the environment.

It is seen that in these examples we had to change the structure of the sentence.

*Incorrect:* To more definitively demonstrate this mechanism….

*Correct:* To demonstrate this mechanism more definitively

*Incorrect:* In this case it is much more difficult to find the optimal values of Dopt and Topt as it is necessary to correctly take into account non-Newtonian properties.

*Correct:* … it is necessary to take into account non-Newtonian properties correctly.

*Incorrect:* It has been shown that this method enables us to effectively manipulate both structural and dynamical properties of the system of dust particles.

*Correct:* It has been shown that by his method enables us to manipulate both structural and dynamical properties of the system of dust particles effectively.

*Incorrect:* Channels of this diameter allow the cell to very quickly get rid of the highly toxic end product of metabolism.

*Correct:* Channels of this diameter allow the cell to get rid of the highly toxic end product of metabolism very quickly.

*Incorrect:* It is important to simultaneously measure the angular distributions of the differential cross sections (URDS) of elastic scattering.

*Correct:* It is important to measure the angular distributions of the differential cross sections (URDS) of elastic scattering simultaneously.

**Using a preposition at the end of the sentence:**

*Incorrect:* AT2-R is only one of the resistors that AngIIs connected to.

*Correct:* AT2-R is only one of the resistors to which AngIIs connected.

*Incorrect:* Gangliosides were first found in ganglions of the nerve system, where the name came from.

*Correct:* Gangliosides were first found in ganglions of the nerve system, that is why they are called gangliosides.

We have considered some examples of incorrect use of prepositions at the end of the sentence. Teaching General English we spent a lot of efforts to make students use the verbs with prepositions at the end of the sentence, especially, at the end of questions. A well-known example, ‘What are you thinking about?’ or ‘Where are you from?’ However, such a structure is not used in the scientific language.

The above examples show how important it is to use terminology properly and fatal mistakes that can appear as a result of incorrect use of terminology.

Much attention is to be paid to the vocabulary studied by the student. It forms their understanding of a proper use of words, which may seem to be synonyms. For example, Sipols (Sipols, 2007: 125) shows the importance of studying different meanings of words, considering “rather” as an example, where it is used as a linking word rather than, as an adverb intensifying the other adverb “slowly” and as an introductory word. It is necessary to teach students to find the correct meaning of words. In solving this task it is useful to compare two parallel texts in the source and target languages in order to identify their differences. This helps students to study different tools used in translations.

**Conclusion**

The article shows that the most dramatic mistakes in translations are caused by incorrectly translated scientific terms. Such mistakes can change the whole content of the sentence or even of the text if the wrong terminology is used throughout the text. The other types of mistakes considered in the article are grammar mistakes giving a large percentage of gross mistakes and stylistic mistakes such as amorphous sentences, parasitic relationships between words and bureaucratic words. We have also considered some examples of incorrect use of prepositions at the end of the sentence and wrong infinitive structures.
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