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CORPUS METHODS AS AN ADVANCED SOLUTION FOR TECHNICAL TRANSLATION QUALITY IMPROVEMENT

Abstract. This article is devoted to the investigation of the main problems encountered by technical translatorswhile translating engineering texts and provision of an alternative solution for them to eliminate translation weaknesses, improve quality, and optimize translation itself.The article defines features of a good quality translation and its requirements.In addition, the ways to overcome various translation difficulties at syntactic, semantic and structural levels are given in the form of recommended translation techniqueswhich are classifiedaccording to specified criteria.The research paperalso provides a practical example of technical translation, the analysis which gives wide opportunities for studying a corpus as an alternative solution for improving thequality of the translation. The article presents types and criteria for a good corpus compilation. Practical usage of a corpus with examples is suggested to outline its main functions and opportunities which can assist any translator in achieving the closest equivalency and adequate translation. The following paper shares experience of developing the Nuclear Corpus and its successful implementationwhile using the most user-friendly corpus managers. The article also demonstrates the advantages of corpus application during translation compared to other modern technologies used in the process of translation. This research encouragesthe idea of further corpus development for the specific translation needs in order to make target texts equivalent at the highest level and meet expectations of the addressees. At the same time, the article makes it possible to study the issue of a corpus further with the purpose to identify new useful opportunities it can provide to facilitate the work of a translator.

Keywords: original text; target text; corpus methods; nuclear corpus; corpus manager; AntConc; translation quality.

1. INTRODUCTION

In view of the fact that the modern world tends to encourage different countries and peoples for globalization and settlement of critical issues affecting their development and safety, cross-cultural and intercultural communication is gaining more and more crucial importance and in most cases, a mediator, i.e. a translator, is involved. Communication in the international technical world is of a particular interest. The work of atranslator involved in technical translation is extremely responsible as the interpreted information can affect people's safety and life. Therefore, it is important to organize a translation processthe way that provides an adequate translation assuring functional, structural, and meaningful conveyance of the required information.

In modern times, translators have a variety of technologies, which can assist themand save theirtime. The most popular tools include online dictionaries, translation memories such as SDL Trados, MemoQ, SmartCat, and just the Internet surfing. An issue of an adequate translation is still challenging and cannot stand aside. Thereby, the conducted research considers the need for quality improvement of the translated texts. Solutions to enhance technical texts at different levels require further careful consideration.

The main objective of the research discussed in the paper was to analyze translation vulnerabilities faced by the technical translators of the Ukrainian company X and offer solutions to support their work in

order to achievethe required quality.

2. METHODS

To achieve te goal, we analysed the requirements for quality translation, classified the problems occurring during translation, and identified techniques suggested for solving the determined challenges. Methods of corpus linguistics were used to analyse translation vulnerabilities in a large collection of thematically organised texts: keyword in context and concordance lists, cluster and collocation analysis, frequency analysis, and other corpus methods. Quantitative and qualitative analysis of nuclear texts translation assisted to obtain objective results and find the most corpus privileged and suitable variants for adequate translation.

3. RESULTS AND DISCUSSION

3.1. Quality translation Requirements

To characterize results of a translation process, the following terms are used: “adequate translation”, “equivalent translation”, “accurate translation”, “literal translation”, and “free translation”.

An adequate translation assures pragmatic tasks of a translation process at the most possible level of equivalency without violating standards or usage of the target language, meeting stylistic requirements of the given texts and complying with socially acknowledged conventionalstandards of translation.Simply defined, an adequate translation is good translation meeting expectations and hopes of communicators or any persons evaluating the quality of translation.

The main task of translation is assuring such an intercultural communication where a text generated in the recipient’s language could fully replace the original and be perceived by a recipient as a text similar to the original in a functional, structural, and meaningful respect (Komissarov, 1990).

An equivalent translation reflects the meaning of the original text at one of the equivalency levels. Any adequate translation shall be anequivalent but not every equivalent translation can be considered as adequate.

An accurate translation equivalently reflects a denotative part of the original meaning and can have deviations from stylistic standards and rules of the target language. An equivalent translation shall always be accurate, and an accurate translation can be partially equivalent.

A literal translation reflects communicatively irrelevant elements of the original texts resulting in violation of the target language standards, or corruption ofthe actual original meaning.

A free translation is usually performed at a lower level of equivalency. It is adequate if it does not have significant losses in rendering the original meaning.

Any translation shall meet the specific requirements. It shall conveythe original meaning correctly, provide a recipient with the original pragmatics, reflect the most important stylistic peculiarities of the original text, and renders the author’s attitude to those objects or subjects described in the target texts (Tyuleney, 2004).

A process of translation is elaborated by certain linguistic difficulties which can be explained by semantics, syntax, and pragmatics of the language expressions of the original language and the target language (Baranov, 2001).

The main problem a translator faces while rendering the original text is dissimilarity of meanings of the original and target units. In spite of the fact that in most cases meanings (“notions”) coincide, ways of their expression are different in different languages.In general, all types of semantic equivalency of lexical units of two languages can be classified as follows: 1) complete equivalency; 2) partial equivalency; 3) absence of equivalency (Galperin, 1958).

Translation of lexis having partial or no equivalents is complicated but the practice of translation suggests such techniques as:

1) mechanical copying including transliteration, transcription, and word for word translation;
2) translation transformations, including:

a) grammatical transformations (e.g.: grammatical substitution, word order change, sentence partitioning, sentence integration, grammatical compensation),

b) lexical (semantic) transformations (e.g.: lexical substitution (specification, generalization, differentiation, modulation), compensation, and metaphoric transformations),

c) complex (lexical and grammatical) transformations (e.g.: explicatory translation, reduction, integral transformation, antonymic translation, metaphorical translation, and complex compensation) (Proshina, 2008).

Other important issues for translation are rendering syntactic meanings as well as solving the problem of correlation between grammatical (syntactic) and lexical-semantic categories. The modern grammatical theory suggests two types of syntactic structures: surface structure and deep structure. A deep structure of a

sentence is a set of semantic or meaningful ("logical") relations, and a surface structure is a specific form which a sentence obtains during communication. Deep syntactic structures represent relations existing in the situation being described. Therefore, they shall be always unchanged. The deep structure of the same language can be expressed in several different ("synonymic") surface structures. To this end, there is no need to save a surface structure of a sentence. However, it does not mean that a surface structure of a sentence does not have any essential information for translation. Surface implementations of the same deep structure in most cases are different according to pragmatics (Barkhudarov, 1975).

A pragmatic factor can be considered as a prevalent factor over a semantic one (Batsevych, 2010). This is one of the necessary conditions to achieve a translation adequacy (Krasnykh, 2009). Pragmatics is closely related to discourse analysis, i.e., study of how sentences are connected between each other in a way to have a certain meaning (Gee James Paul, 2011). Pragmatics includes issues related to the understanding of symbols or messages with their interpretation by participants of a communicative process depending on their linguistic and extralinguistic experience, or background knowledge. A translator should always consider this aspect because the translation is most accurate if it is absolutely clear for the addressees.

Not all types of translation materials require consideration of a pragmatic factor at the same degree. For example, technical and scientific literature can include not only technical formula, terms, and numbers, so a translator needs to be prepared for using a pragmatically oriented approach. Toconveythepragmatic meaning, a translatorcan use various techniques (Lawrence, 2007).However, the use of translation techniques requires a sense of proportion because an excessive use of substitutions can cause semantic or stylistic mutilation of the original text.

Adequacy of translation provides an equal consideration of both pragmatic and semantic factors (Barkhudarov, 1975).

Below is the analysis of translation of nuclear texts given for a closer look at vulnerabilities which can be encountered during translation.

3.2. Analyzing Nuclear Text Translation

The analysis is based on the review of nuclear texts translated by specialists at Company X working under confidentiality provisions. To evaluate the process of translation, quality of the target texts and to identify mistakes made by the Company translators, 773 units of translation were considered while comparing them with the edited versions of a native speaker. In the result of the analysis, various mistakes leading to the failure to achieve a complete equivalency of adequate translation as well as their reasons were identified. According to Proshina (2008), in evaluating translation, four types of mistakes can be marked: distortions, inaccuracies, stylistic drawbacks, and solecisms.

Distortion is a blunder marring the sense of the original by describing another situation and, thus, misinforming a receptor. Distortions generally occur because of the translator's misunderstanding of the text, poor language knowledge, and insufficient background awareness. Inaccuracy occurs when a translator mistranslates some detail of the text. Inaccuracies result from misunderstanding a word or a structure.

The stylistic drawback is a deviation from target language stylistic and semantic norms. Often, this fallacy is due to underestimating translation transformations.

Solecism is a syntactical error resulting from breaking structural norms of the target language because of the translator's illiteracy or because of source language interference.

69% of all mistakes are made by solecisms including syntactic mistakes, spelling,and punctuation (Fig. 3.1-3.2), e.g.: *У відповідності до вимог стандарту на підприємстві існує в наявності документована інформація, необхідна для забезпечення ефективного планування, функціонування та контролю процесів СМЯ - In accordance with the requirements of the standard Company has available documented information needed to ensure the effective planning, operation and control for the QMS processes* instead of *In accordance with the requirements of the standard, Company X has available the documented information needed to ensure the effective planning, operation, and control of the QMS processes*.

The top rate is taken by grammar errors, in particular, usage of the articles, e.g.: *Activities of Company and its governing bodies are determined by the Statute; the Externalenvironment in which Company operates is changeable and in constant motion*. The absence of the article in Ukrainian or Russian causes difficulties for translation into English. Fixed English word order does not always coincide with a free word order in Ukrainian or Russian. Many mistakes occur due to the nature of the original and target languages. Being the agglutinative language, English entraps a translator while rendering the meaning of multi-component clusters and cause problems in using prepositions.

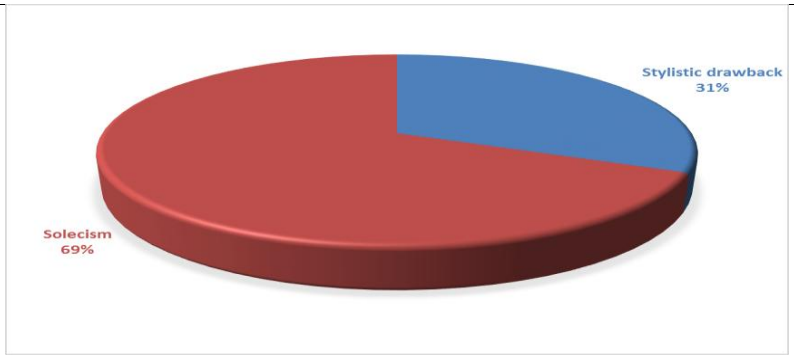

Fig. 3.1. Types of mistakes

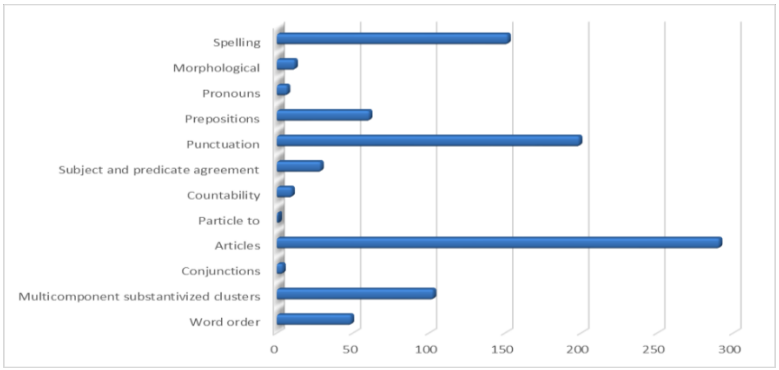

Fig. 3.2. Errors causing solecism in the target texts

Another interesting observation is related to usage of the Passive Voice which is more frequently used in Ukrainian/Russian. The analysis shows that the English technical language is less "passive" and is characterized by the usage of simple active sentences instead of the complex sentences full of passive constructions. Punctuation mistakes occur due to the copying of the original language punctuation rules, e.g.: *market trends, statistical data, and information on projections*. Furthermore, in Russian or Ukrainian, punctuation is structurally dependent and in English, it is logically and communicatively bound. According to Proshina (2008), the principle of English punctuation can be formulated as follows: the closer semantic bonds, the closer the word position should be. The more optional information is, the more separated (by punctuation marks) the sentence parts are. Consulting a reliable reference containing similar types of sentences with the correct punctuation, spelling, and grammar would be of a great value in order to prevent such mistakes.

The list of mistakes also includes stylistic drawback (31%). This type of mistakes includes lexical mistakes, mechanical copying, and incorrect usage of verb forms (Fig. 3.3).

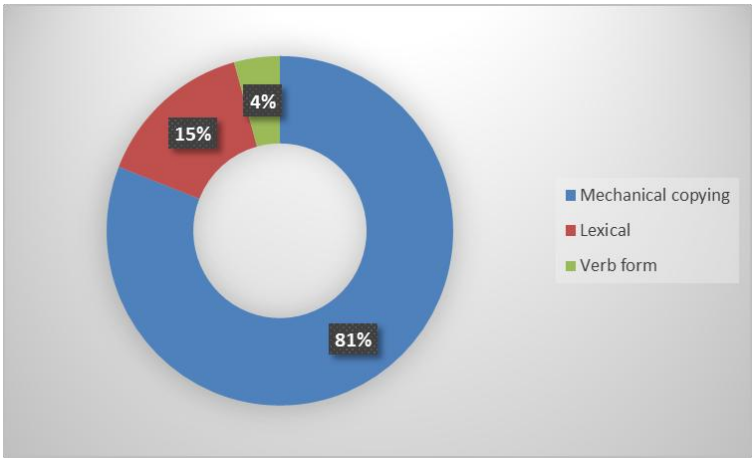

Fig.3.3. Stylistic drawbacks

Most mistakes are related to mechanical copying. Despite that phrases and structures are built according to the rules, they look "dry" and are formed without the feeling of the language, e.g.: *Підприємство визначає процеси, необхідні для СМЯ, та їх застосування на підприємстві – Company determines the processes needed for the QMS and their application throughout Company* instead of *Company X determines the processes needed for the QMS and how those processes will be applied throughout Company*. Unnatural translation when in most cases word for word translation is used makes the target language a "lifeless" calque.

Incorrect interpretation of words' meanings comprises 15% of general percentage (e.g.: *workshops* and *storages* instead of *workplaces* and *storage areas, persons* instead of *personnel, exploitation data* instead of *market data, and issues* instead of *factors*). In case of doubts in the usage of a certain word or term, a translator should refer to the contextwhich allowsrevealing the only one meaning of a polysemic word within the given context. Usage of incorrect verb forms can cause inaccuracies and distort style, *e.g.: Компанія Х гарантує, що володіє здатністю виконувати вимоги до продуктів і послуг, що пропонуються споживачам. – Company X ensures that it has the ability to meet the requirements for products and services to be offered to Customers* instead of *Company X ensures that it has the ability to meet the requirements for products and services offered to Customers*.

The analysis results clearly show that Company X needs optimization of a translation activity to eliminate mistakes occurred.

The necessity to improvethe quality of translation encourages the application ofmodern technologies. The review shows possibilities ofcorpus linguistics methods and its tools. Corpus is understood as a set of electronic texts collected with a logical intention that connects them.

There are many types of corpora in corpus linguistics such as research and referential, full-texted and fragmented, diachronic and synchronic, dynamic and static, national and specialized, parallel and comparable, written and oral, learner, etc. (Zhukovska, 2013). The types translators of Company X can beinterested in are parallel and comparablecorpora. A parallel corpus is a set of texts both in the original language and their translated versions, aligned between each other. A comparable corpus is a set of monolingual texts, which can serve as a reference for the use of a specific language unit in communication.

The created **Nuclear Corpus** consists of three sub-corpora:

1. The Glossary which is a parallel sub-corpus that includes terminology on nuclear safety and radiation protection in English and Ukrainian consisting of 10620 word-types and 87109 tokens.

2. Nuclear Standards parallel sub-corpus includes international nuclear standards and company standards in English and Ukrainian of 6824 word types and 59828 tokens.

3. A monolingual sub-corpus called Publications which includes English original IAEA publications and articles from the Nuclear News on such topics as fuel, industry, international, isotopes and radiation, meetings, policy and legislation, power, security, special, waste management. The original sub-corpus consists of 12466 word-types and 263839 tokens.

Each of the provided sub-corpora is designed to implement specific tasks of Company X translators. In particular, "Glossary" provides English terms and their target equivalents along with an explanation of the meaning. "Nuclear Standards" gives examples of texts in the original and target languages used for compilation of company documents with their subsequent translation. "Publications" supports meanings, provides correct syntax including spelling and punctuation while assuring pragmatics through the original contexts. Parallel sub-corpus, aligned using ABBYY Aligner, is combined with a monolingual sub-corpus in order to provide a translator with comprehensive information on the practical usage of a certain term or phrase along with their translation. Still, they can be used separately depending on the purpose. In general, the corpus is made of 2317 word types and 410776 tokens. The corpus is dynamic and can be expanded as needed. Moreover, the corpus is specialized that is confirmed by the relative frequencies of words in it comparing to the frequencies in the Brown Corpus and LOB (ref. Table 4.1).

From the Table above, it can be seen that the most frequent words in British corpora are *conditions* and *level*, while they are at the 7 and 8 places in theNuclearCorpus *quality and reactors* are the most frequent words in the Nuclear Corpus; however, they are not used frequently in other corpora.

To do a linguistic analysisof the particular texts, there can be added some information in the form oflinguistic annotation such as:

- Morphological annotation or part-of-speech tagging (POS-tagging), which includes grammaticalcategories. One of the most reliable taggers for English is CLAWS (Constituent-Likelihood Automatic Word Tagging System). It achieves 97% accuracy. This system was used for annotation of the British National Corpus.

- Syntactic annotation, which describes syntactic connections between lexical units and different syntactic structures (such as the subordinate sentence, verb collocations).

Table4.1

Relativefrequencies of words in different corpora

№	Word	The Nuclear Corpus	The Brown Corpus	LOB
1.	quality	9.789978	1.109611	0.992008
2.	reactors	9.595153	0.246580	0.186002
3.	combustion	9.546446	0.01645	0
4.	material	9.400327	4.376799	3.596029
5.	radiation	9.351621	3.637059	0.434004
6.	analysis	9.181149	4.438444	3.472028
7.	conditions	9.181149	4.931605	4.526037
8.	level	9.108089	4.746670	5.890048
9.	dose	8.767145	0.308225	0.930008
10.	security	8.767145	0.616451	0

- Semantic annotation, which includes semantic categories a word or word combination refers to and narrower subcategories that specify their meanings.

- Prosodic annotation, which describes emphasis (prosody) and intonation. For a corpus of oral texts, this type of annotation also includes discourse annotation for designation of pauses, iterations, warning, etc.

To annotate texts, translators can use a program such as Grammarscope.

The main purposeof thesuggested corpusis to provide translators with an access to the original texts where they can get familiar with the natural nuclear language learn to express ideas as native speakers, see peculiarities of style and grammar, including punctuation, of the written English language in the nuclear context. The **Nuclear Corpus** is compiled according to the required criteria as specified by Demska-Kulchytska, 2004:

1. The corpus is representative. It represents the nuclear subject, including style and genre.
2. It is authentic as it includes written texts produced by native speakers who have a professional capacity for nuclear engineering.
3. It is sampled. It contains texts depending on the strategy chosen, type of a corpus and its purpose.
4. It is balanced. The number of textual resources is proportional.
5. Finally, the corpus is machine-readable. All texts are located in separate .txt files.
6. The corpus is not annotated as it's not required by the aim of the investigation.

To use the given corpus effectively, translators will need corpus managers such as AntConc and GraphColl. These tools provide ways to collect necessary information. They assure search of specific word types, the search of word types according to lemmas, search of groups of word types in the form of phrases, search of word types according to certain morphological signs and search of correct punctuation, parts of words, spelling options, etc. Use of corpus tools allows not only to measure lexical units in contexts but also to measure data on the frequency of word types, lexemes, grammatical categories, the co-occurrence of lexical units, their collocations, word clusters, etc. The frequency helps to define differences between the semantics of synonyms, to determine contexts particular for synonymic words, to distinguish between styles and genres, and collocations attributed to certain social, gender and age groups. These statistics provided by corpora help to assure objectivity and reliability of the searching results as compared to other methods. For example, words ***operator*** and ***operating organization*** can be used as synonyms. To observe their differences, using AntConc a translator can see that the first option is used more frequently (83 hits) than the second option (15 hits) and he/she can differentiate between their usages while examining their context (Fig.4.1-4.3).

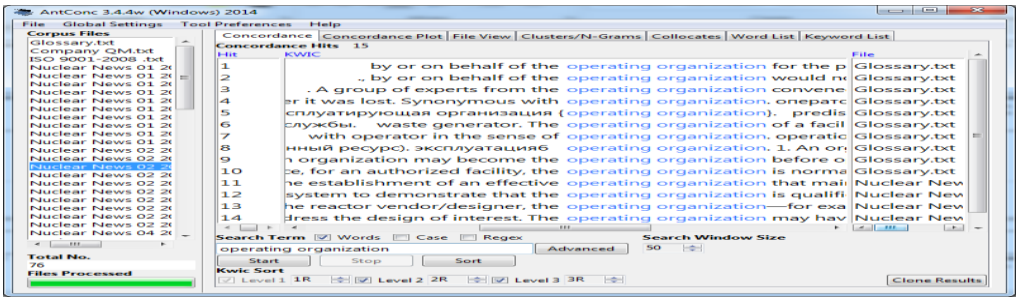

Fig.4.1. Concordance search (AntConc) (example 1)

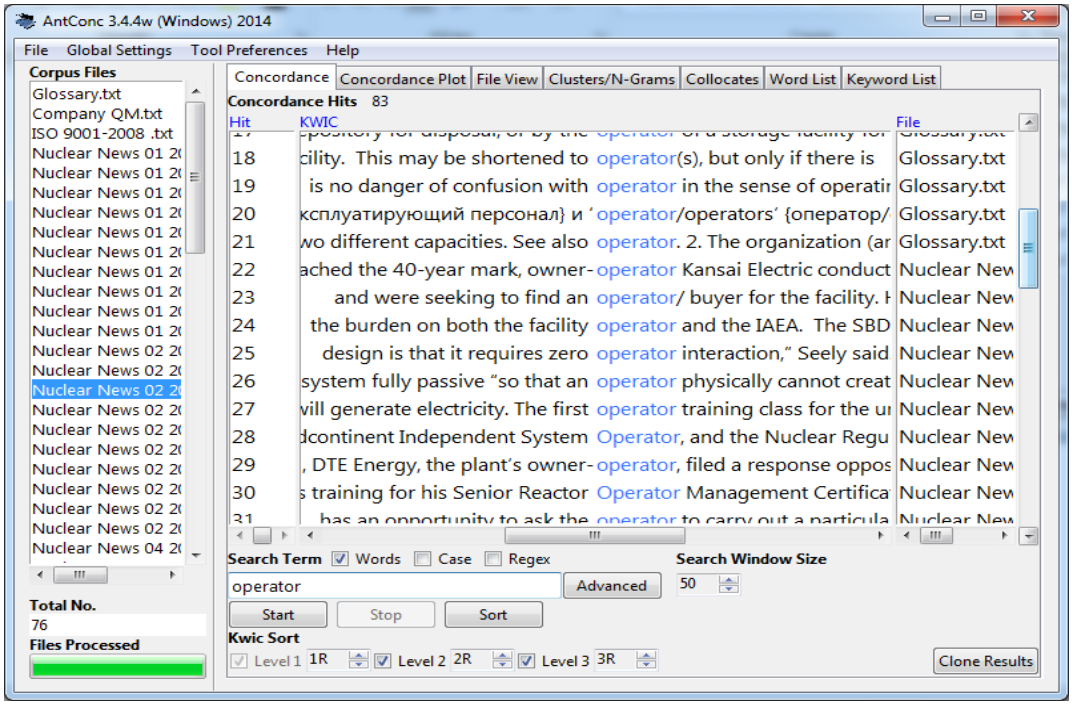

Fig.4.2. Concordance search (AntConc) (example 2)

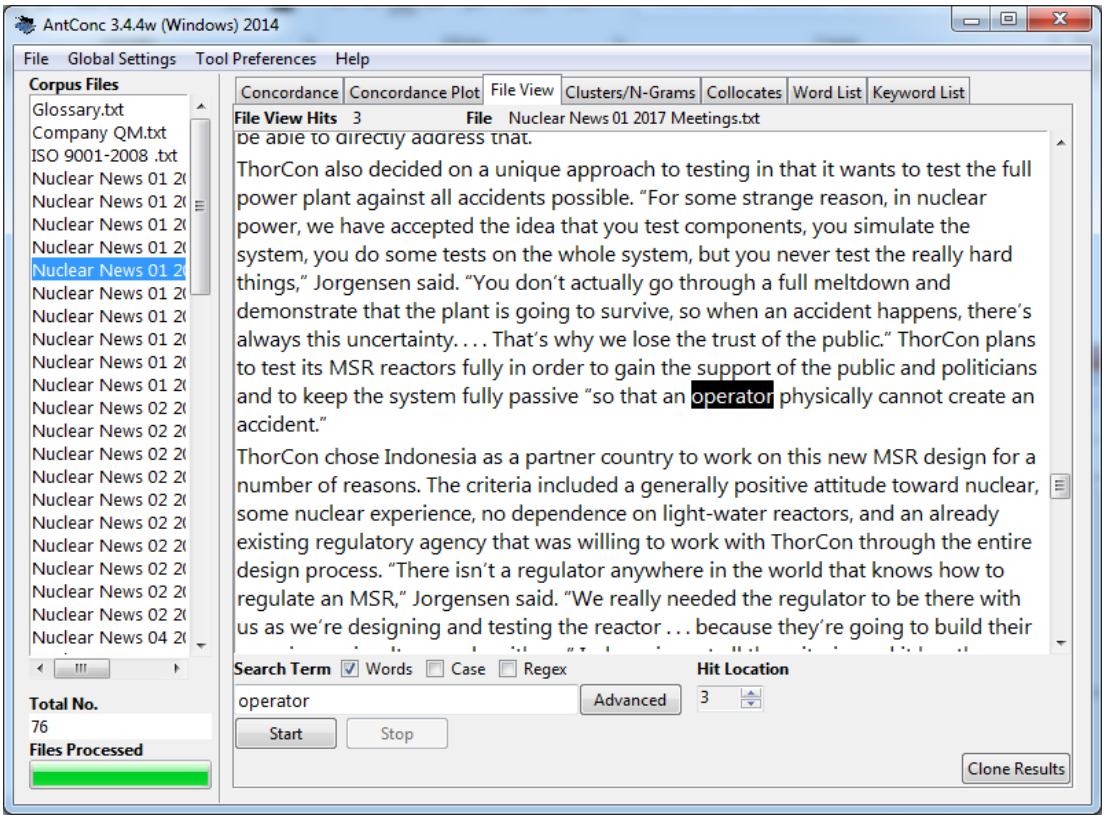

Fig.4.3. Context view (AntConc)

It is also possible to find a file where the needed word is used frequently to see more contexts (Fig.4.4).

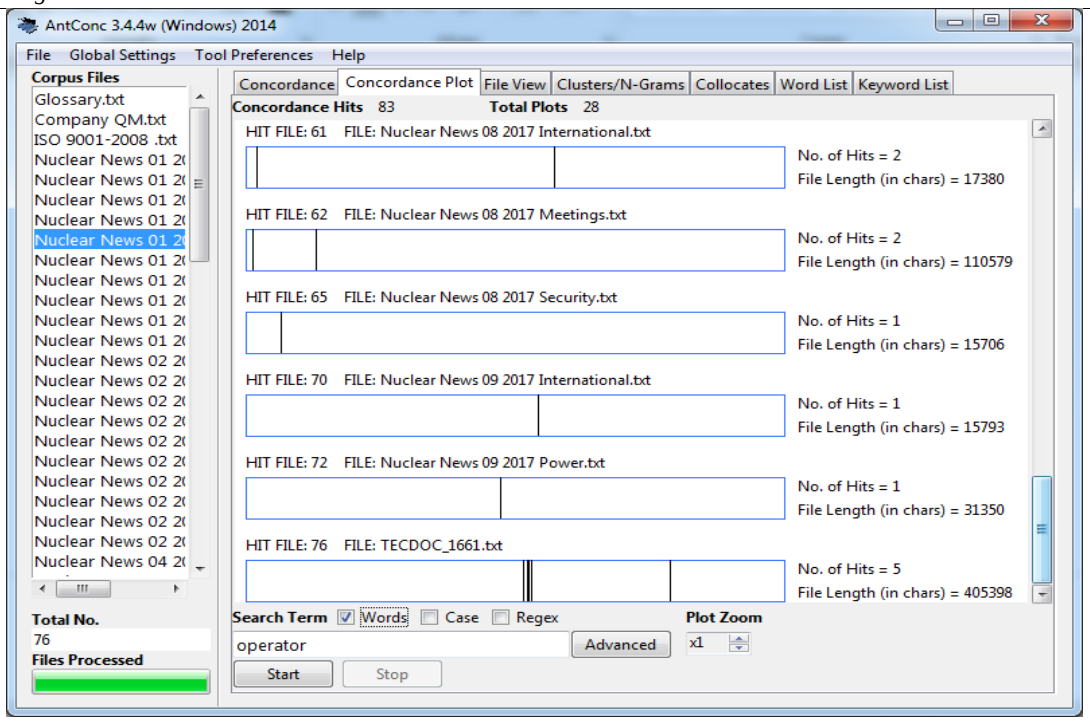

Fig. 4.4. Searching for a file with the biggest number of the target word hits (AntConc)

Sometimes, translators encounter multiple-word clusters which are not easy to translate. Using a corpus manager and the corpus, this task becomes much easier. While setting the required parameters, it is possible to find the appropriate clusters with their further translation and usage (Fig. 4.5).

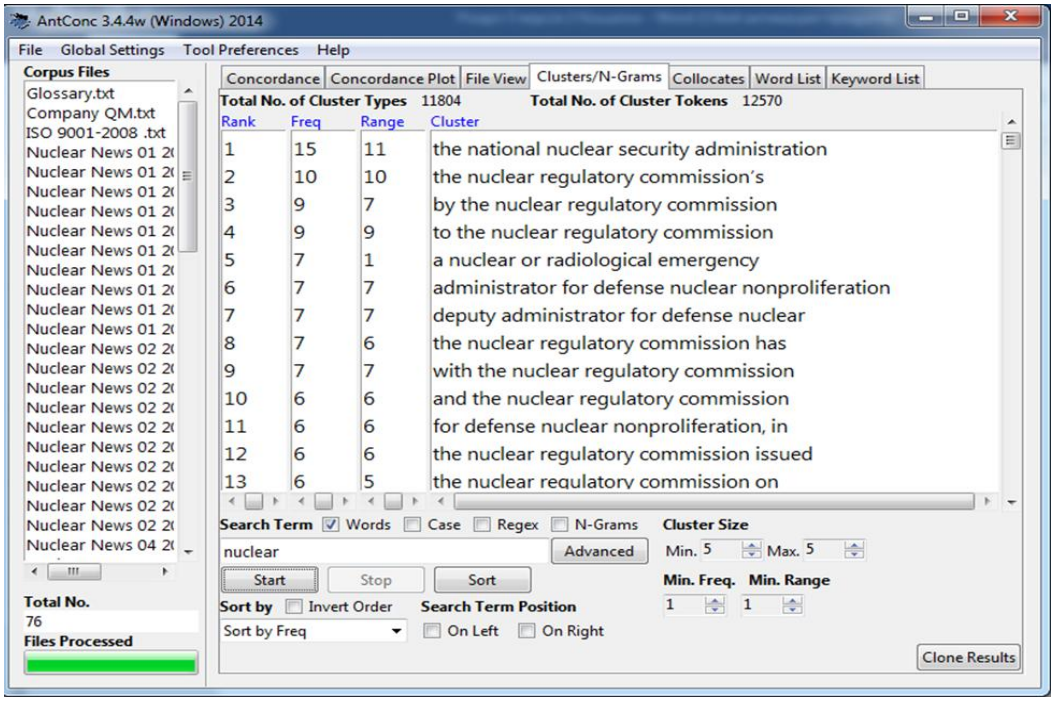

Fig. 4.5. The search of clusters (AntConc)

When translating into English, often a translator can have doubts related to the correct use of prepositions, articles, or notional words with the target word. AntConc provides a hint by its Collocates function. It is also possible to set the required parameters for the search. For example, if it is needed to find the most frequent collocates with a set parameter 5 words preceding and 5 words following *nuclear*, the results can be as shown in Fig. 4.6.

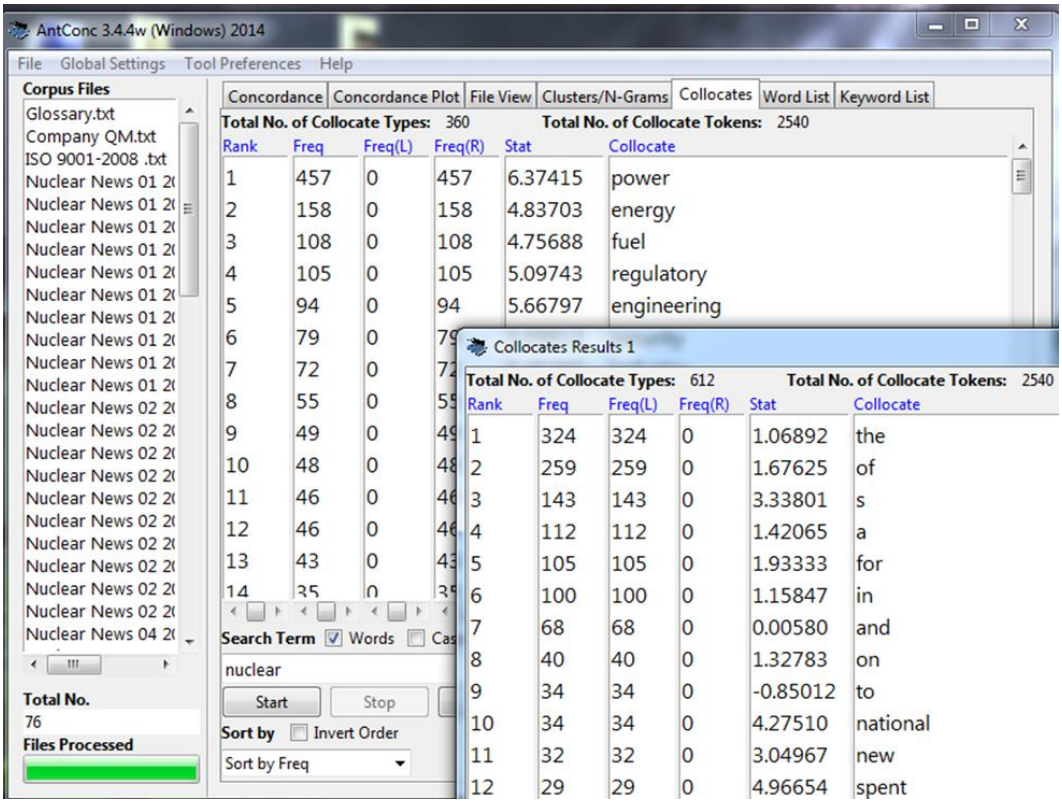

Fig. 4.6. Search of collocates

GraphColl provides information on collocates in the form of graphsas shown in Fig. 4.7. The selected parameters are MI, span 1 to 1. The results can be also saved in the form of the Excel tables.

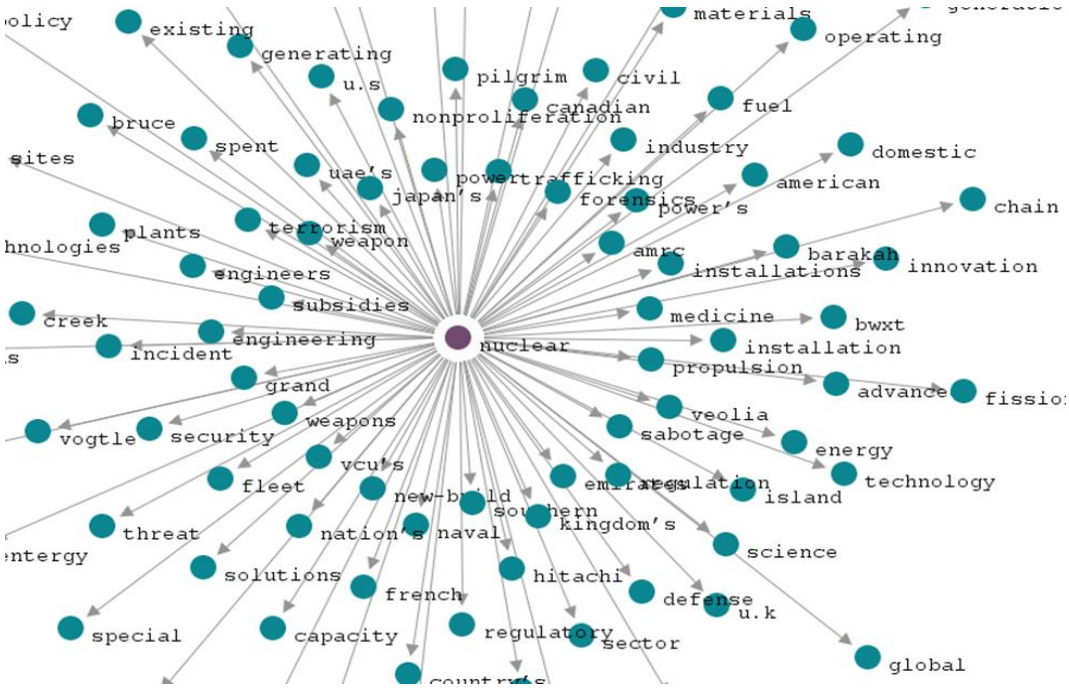

Fig. 4.7. Collocates Graph

When a translator is not sure how to render, for example, *тяжелая авария* in English, the corpus gives the answer as shown in Fig. 4.8.

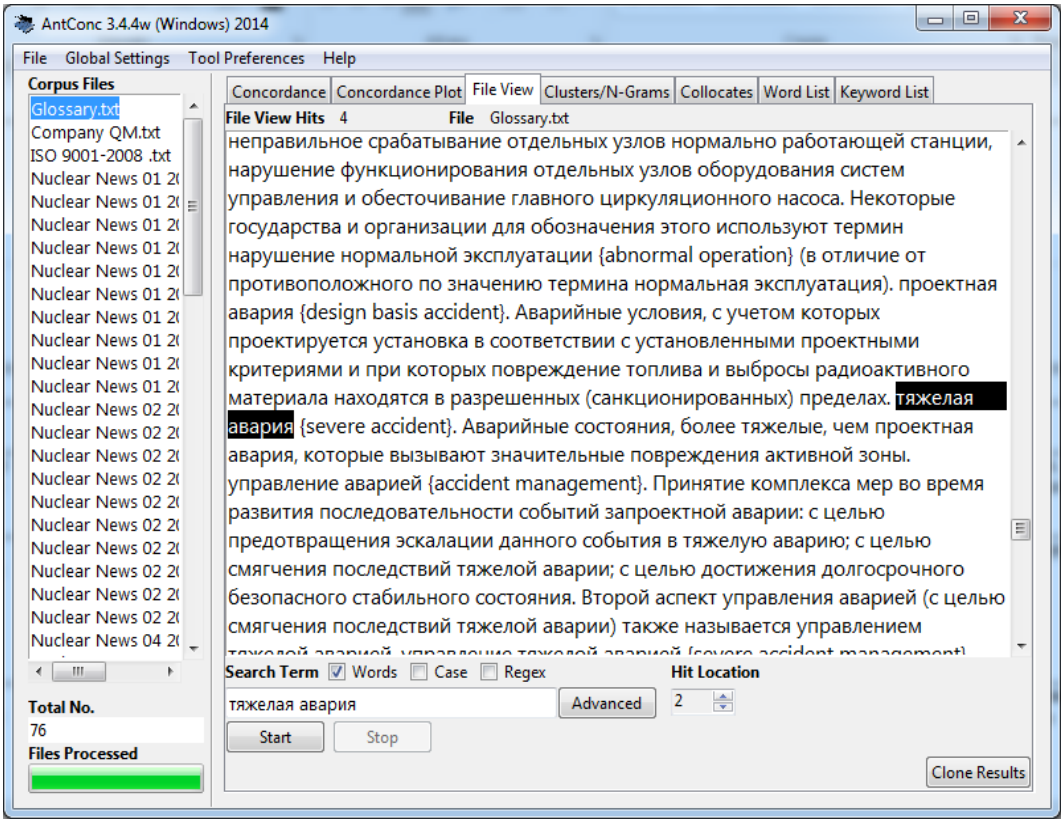

Fig. 4.8. Searching translation for a term (AntConc)

In order to get an idea of how this term is used in original texts, a translator can consult the corpus as shown in Fig. 4.9.

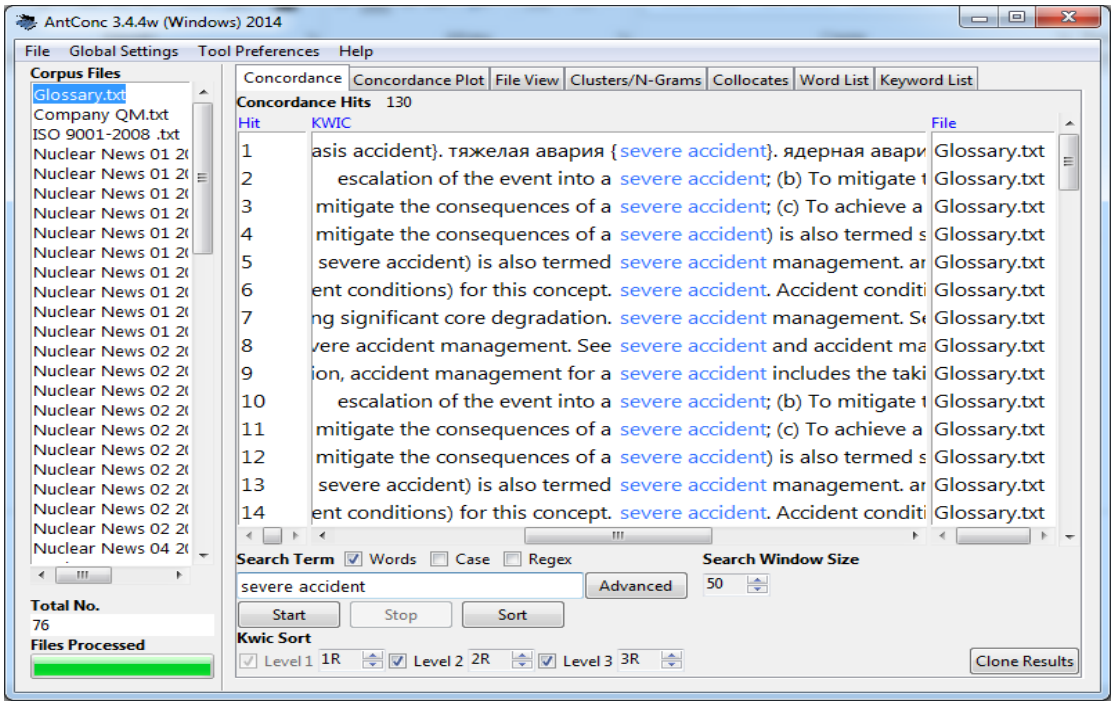

Fig. 4.9. Searching for examples of the term usage (AntConc)

In addition to getting the required information, a translator can observe other features in the original texts such as grammar, spelling, and punctuation.

The used corpus managers are quite user-friendly and can give much more results depending on a translator's desired objectives and settings. In addition, they do not require much space and can be stored on a USB stick. And a corpus can be used as a reliable reference tool to alleviate any concerns.

4. CONCLUSIONS AND SCOPE FOR FURTHER RESEARCH

The performed research shows that due to differences of the English, Ukrainian, and Russian languagesin their language systems and speech models, translators make certain inaccuracies affecting the quality of the technical translation. By creating an appropriately compiled corpus or using a ready-made corpus, translators can settle the arising issues and effectively perform professional tasks. Corpus methods provide translators with an advanced solution to reduce syntactic, semantic, stylistic, and other types of translation mistakes. The appropriately arranged original texts ready at hand are a good reference to counter concerns and learn the language peculiarities at the same time. Corpus managers such as AntConc or GraphColl offer useful functions, which can be applied during translation. Corpus approach and use of reliable corpus managers provide a translator with an excellent referential tool and solves many translation difficulties. While finding word clusters, collocations, determining contexts, identifying differences between synonymic words, solving a polysemy issue, translators become more confident in the results of their work. Furthermore, a corpus in combination with other modern technologies can assist in achieving adequacy of translation at the highest level that is the main goal of any translation.

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О. В. Ткачик, М. С. Кошкіна. Методи корпусної лінгвістики як передове рішення для покращення якості технічного перекладу. Статтю присвячено аналізу основних проблем, з якими стикаються перекладачі технічної літератури під час перекладу спеціалізованих текстів, а також пропозиції щодо уникнення перекладацьких помилок, покращення якості та оптимізації процесу перекладу за допомогою альтернативного підходу – застосування методів корпусної лінгвістики. Запропонована стаття визначає специфіку якісного перекладу та відповідних вимог. Крім того, надано та класифіковано шляхи подолання різних труднощів перекладу на синтаксичному, семантичному та структурному рівнях у формі перекладацьких прийомів. Дослідницька робота містить практичний аналіз перекладу текстів технічного спрямування, результати якого надали широкі можливості для вивчення корпусу як альтернативного рішення для покращення якості перекладу. Стаття розглядає типи та критерії для створення належного корпусу. Пропонується практичне застосування корпусу на прикладах для окреслення основних його функцій та можливостей, що сприяють досягненню найповнішого рівня еквівалентності та адекватного перекладу. Представлена наукова робота містить досвід розробки корпусу theNuclearCorpus та його вдалої реалізації з використанням найзручніших корпусних менеджерів. Приділено увагу перевагам застосування корпусу під час перекладу, таким якконкорданс, відносна та абсолютна частотність слів, ключові слова, позитивна та негативна частотність,сполучуваність

слів, багатокомпонентні групи, контекстуальне вживання слів. Ця робота спонукає до подальшого вдосконалення корпусу відповідно до певних перекладацьких потреб з метою досягнення найвищого рівня еквівалентності тексту перекладу та тексту оригіналу, задоволення очікувань адресатів перекладу. Стаття відкриває перспективи для подальшого вивчення корпусу з метою виявлення нових корисних можливостей полегшення роботи перекладача.

Ключові слова: текст-оригінал; текст-переклад; корпусні методи; корпус ядерної тематики; корпусний менеджер; AntConc; якість перекладу.

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