Lexicographical Aspect of Technical Terminology Of Modern Germanic Languages

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Keywords: Compiling of terminological dictionaries, Terms, Terminological lexicography, Technical translation, Sublanguage, Terminological combinations.

Abstract. This article discusses the problems of standardization of technical terminology, their ordering in specialized dictionaries that will remove existing difficulties in the translation of scientific-technical texts in the practice of teaching subjects related to communications technology, transfer to the installation of equipment, adaptation of technical documentation for the various fields of science and art. The relevance of the article in the unification of terms increases due to the forthcoming World Exhibition «EXPO – 2017», since it will showcase the latest achievements in the field of science and technology of global significance. The purpose of the paper is to standardize the technical terms of leading languages (German, French, English), issued in the form of a glossary of terms and acronyms, with an explanation of their meanings, that has great relevance to specialists in various fields of science and technology, translators, linguists, scientists who face daily translation problems with highly technical terms.

1. Introduction

Nowadays normalization, creation of terminological dictionaries which could satisfy completely the needs of experts working in various areas of science or technology are very important. The development of ways of term formation and terminology contributes to the active participation of experts in solving actual issues of modern science and technology, thereby increasing their informational awareness.

Clarification, definition, revision of the meanings of terms and analysis of their thematic dictionaries cognitive meanings are among the most acute problems determining the progress of scientific studies. Actually, transnational practice shows that without a special terminological dictionary correct translation of scientific and technical literature and documentation is impossible. Modern texts abound in new scientific and technical terms. Practically, every author of scientific and technical publication uses new terms or well-known terms in new specified special thematic dictionaries meaning. That is why research in terminological lexicography with practical important for scientific and technical translation.

ISBN: 978-605-64453-0-9

2. Theoretical background

According to J.N. Marchuk, one special dictionary is published every day in the world. «The necessity of publishing the latter special dictionaries is essential and justified since the quantitative rise in terminology outruns the rise in special dictionary issues». According to S.V.Grinev, for instance, at the beginning of the 20-th century all scientific and technical terminology in German included about 3,5 million terms. Nowadays, there are more than 4 million terms in the terminological system of electrotechnics in the German language thematic dictionaries [1**]**.

It should be noted that it would be more reasonable to concentrate on the issue of special and thematic dictionaries, which could reflect more completely a terminological flow in well-established and new thematic spheres that are the results of scientific and technical progress. Many authoritative dictionaries define "Lexicography" not as a science, but as the theory [2,345; 3,181; 4,382] and practice of dictionary compiling.

According to the formation of theoretical Lexicography, the peak of Lexicography in Western Europe was at the end of 80s and of the beginning of 90s of the 20th century. At that period, alongside with the publication of different specialized dictionaries there were well-known lexicographical associations, societies, and seminars such as: International Lexicography Course (Great Britain – University of Exeter); that published newsletters about international lexicographical studies on a regular basis.

At present time, international lexicographical symposiums were held at the University of Copenhagen, training courses at the University of Birmingham, international school-seminars at the Ivanov State University. The European Association of Lexicography has been very active as well. It now units not only European lexicographers but also scientists from the USA, Japan, Australia. The Organization holds publishes an international congresses, issues on annual International Lexicography Journal with articles about historical, educational, scientific and technical lexicography.

The historical investigation of terminology under our study shows that considerable efforts were made to organize electro – technical terminology at the end of 19th century, when thousands of new terms and concepts appeared. Besides, at that period there were already incidents of confusion in use of terms, since, according to the session bulletins of International electrotechnical commission, different terms were used to express the same notion [5,26]. For instance, according to the same source at the beginning of the work of International electrotechnical commission in 1880, fifteen different terms were used to name electrical resistance.

During the epoch of the Soviet Union, in the country 750 000 terminological standards on various fields of knowledge were in active use. In the National Scientific Research Institute of Technical Terms the databank into which only standardized terms were entered was compiled. The term was given in the initial form, the complete definition of the term with its equivalents in several foreign languages was applied.

3. Results

The terms established by the standard, were obligatory for application in all kinds of documentation, in scientific and technical, educational and reference books. The German standardized terms of electro techniques, that have come to Russian, were given in State Standard (GOST) certification systems of the USSR in the following way: State Standard (GOST) 21415-75. Condensers of thermal capacity. Terms and definitions; GOST 23150-78. Switching of channels and switching of messages. Terms and definitions; GOST 13699-80. Record and information reproduction. Terms and definitions. Equivalents of terms were given at least in four languages, as shown in the table below:

ISBN: 978-605-64453-0-9

Table 1. Terms and definitions in four languages

German	Russian	English	French
Basis	Baza	Base region	Région de base
Ortliches Telefonsystem	Mestnaya telefonnaya sistema	Local telephone system	Système téléphonique local
Impulsverhältnis	Impulsnyi koeffitsient	Impulse coefficient	Rapport d'impulsion
Wärmebeständigkeit	Teplostoikost'	Thermal endurance	Endurance thermique
Ableitungsstrom	Tok utechki	Leakage current	Courant de fuite
Feldeffekttransistor	Polevoi transistor	Field effect transistor	Transistor à effet de champs
Sureleiterwerkstoff	Sverkhprovodnikovau material	Supercoduktor material	Matériau superconducteur
Bandsperre	Rezhektornyi fil'tr	Band-stop filter	Filtre coup-bande
Integrierte Mikroschaltung	Intergral'nays mikroskhema	Itegrated microcircuit	Microcircuit integer
Schallaufziehnung	Zvulopis'	Sound recording	Enregisrement du son
Kapazität eines Kondensators	Emkost'	Capacitance of a capacitor	Capacité d'un condensateur

In the process of unification of German terminology in Russian, international scientific and technical organizations play a significant role, including - the International Union of Telecommunication, the International electrotechnical commission, the International organization of standardization, etc. So, 160 countries of the world – members of the International union of telecommunication accepted the Regulations of radio communication which is the basic document that regulates the use of telecommunication terminology and is obligatory for all members. The first chapter of the mentioned document is devoted to the terminology necessary to adhere to at in international cooperation. In total, more than 180 terms are defined, for example:

- nazemnaya radiosvyaz' (any type of radio communication, except space communication or radio astronomy) - *Terrestrial Radiocommunication. Any radiocommunication other than space radiocommunication or radio astronomy;*
- sudovoi avariynyi peredatchik (ship transmitter, used on the frequency of calamity, connected with disaster or safety) - *Ship's Emergency Transmitter. A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes.*
- odnopolyusnoye izlucheniye (amplitude-modulated emission with one side band) - *Single - Sideband Emission. An amplitude modulated emission with one sideband only.*
- vsemirnoye koordinirovannoye vremya (UTC) - (time scale, based on the second in the system of units, determined and recommended by the international consultant Committee by radio and supported by the International Bureau of Time) - *Coordinated Universal Time (UTC). Time scale, based on the second, as defined and recommended by the International Radio Consultative Committee, and maintained by the International Time Bureau*.

At the present stage of development of science and technology, the problem of scientific and technical terminology, its correct use, understanding and interpretation become more and more important, especially in connection with the penetration of IT technologies into all areas of science and technology. Considerable achievements in microelectronics and microprocessor technology, development of nano-technologies have provoked penetration of a huge number of foreign terms (including German) into corresponding branches in Russian that has as a consequence caused creation of the International Information Service on scientific and technical translations (IIS-Interinformperevod). Concerning the problems of formation of conceptually-terminological apparatus of modern linguistics it would be interesting to state O.Vjustera's opinion. According to the scientist, the problem of streamlining linguistic terminology should be reduced to observance of the following moments:

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- studying real linguistic word usage;
- selection of terminology and its description in dictionaries of linguistic terms;
- comparison of national terminological systems in bilingual and multilingual dictionaries.

In other words, it is necessary to find and formulate such descriptors (words or combinations) which could most precisely define the nature of the given phenomenon designated by the given concrete term that as consequence would provide viability of this or that terminological system, its openness.

In the light of the above-listed problems, it seems necessary develop to design a thematic electrotechnical terminological databank on electronic carriers with a set of remote inputs in the dictionary, and also design automated dictionaries and systems working in a dialogue mode. Preparation of this sort of systems containing standardized symbols and terms is an important and necessary phase of standardization in and achievement of international coordination that will lead to an increase in a technological level and quality of the product. The given position, in our opinion, becomes especially actual in the light of the ratified customs union between three leading states - Kazakhstan, Russia and Belarus as well as fortchcoming world exhibition “EXPO - 2017”.

Within the limits of the given work we completed the first stage of creation of such a dictionary, namely a dictionary of electro technical terms which have not found reflection in the existing technical and polytechnical German-Russian dictionaries. The electronic variant of the dictionary in the mode of electronic access is actively used by us in teaching the German language to students of electrotechnical, aerospace, radio engineering, polygraphic and machine-building faculties of OmGTU (Omsk State Technical University). The terminological thesaurus of the dictionary is in a mode of constant replenishment as there is a constant interaction between terminology and non-terminology.

To study terminological vocabulary, it is necessary to distinguish between term fixation and term functioning [6]. O.Vjuster refers special dictionaries, terminological state standard specifications, collections of recommended terms, etc., where terms are registered in isolation, to the sphere of term fixation. He refers scientific speech, special scientific literature, in a broad sense of this word, to the sphere of term functioning. Further, the scientist states and confirms the opinion that functioning spheres are primary, and fixation spheres are secondary. Terms are already established and consequently yield to operations of elimination then polysemy reduction, synonymy, «unpronounceableness», "discrepancies" to concept, "longueur", etc. [6].

We refer the special scientific literature, and a text as part of it, to the functioning sphere of the term system of electrotechnic sublanguage. In the text a term, as well as any word, reveals its lexical and grammatical values, i.e. is need at this level as a unit not only of a term system, but also as a language unit hence, has all characteristics allowing to refer it to a certain part of speech.

Determining the specific essential features of terms allows a researchers to distinguish the co-called «pre-terms» a certain sublanguage. «Pre-terms» can be viewed as special units. Text can later because regular terms in a certain sublanguage system.

As a result none of these units from the sphere of functioning can pass to the sphere of fixation and be registered in special dictionaries,

«Pre –terms» in the sphere of functioning are necessary condition for generating new terminological systems in the sphere of fixation.

In our case, for construction of term system it is necessary to have pre-terms, i.e. units at level of functioning of terms, to unite to essential signs, and thereby to generate term system, as sphere of fixing of terms.

After J.N.Marchuk we believe that the material selection for an educational dictionary should take into account three criteria: quantitative, semantic and specific depending on the type of a dictionary. The priority task of terminological dictionaries is providing the means (adequate terms) for the purposes of scientific communication. In translational practice a convenient organization of the dictionary information is very important. It is necessary to notice that two aspects come to the

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foreground: classification of semantic values and word combination typology [1; 5].

One of the most complex problems of term selection for the word list of terminological dictionaries demand the solution of some separate issues, in particular such as:

1) border line between terms and non-terms;
2) polysemy, homonymy and synonymy of terms;
3) phraseological units as terms;
4) demarcation line between general scientific and special science terms, a particular science terms and terms of allied sciences or branches of one sciences.

Statement of problem of border of the term and non-term has an establishment of limits of the lexicon for an object, which is the subject of inclusion to terminological dictionaries. Separating terms from non-terms is of the most importance for compilers of terminological dictionaries. We follow the definition of a term suggested by A.S,Gerd. The term is a word or a word combination of any concrete language having professional value, the present idly properties and changes in terminology, existing earlier or created again, expressing precisely enough the complete professional concept [3,194-203]. The major sign of a term is its occurrence in a system of concepts of a given branch of science or technology. We define terminology of electrotechnics as a term system which not only reflects terminology of the given area of knowledge at present, but also recreates its history. Electrotechnical terms include simple, derivative and composite terms, terminological combinations and terms-reductions. First of all, it is necessary to begin the description and research of terminology of any sublanguage with the selection of terminological units. In spite of the fact that there much attention has been paid to the selection of terms, some linguists including S.V.Grinev, states that each author solves this problem in his own way according to the tasks set [1, 26].

Experts name the first stage of work with any term system as descriptive. This is a stage of description of the terms selected for study and establishment of their value. The following stage of work is prescriptive, where recommendations about the use of terms are given [2,24]. As the terms of electrotechnics have yet been not exposed to complex research and streamlining, it represents the major problem.

The German-Russian technical and polytechnical dictionaries studied by us contain terms of electrical engineering, but they are not singled out as such. During our research it was established that the last editions of the German-Russian dictionaries on electrical engineering are dated 1962, 1968 and 1973.

During the analysis of home dictionaries we have revealed five dictionaries, based on the material of Russian and Kazakh or only the Kazakh languages, indirectly containing inter branch terms on power, physics, chemistry, electrical engineering, metrology, standardization and patent science:

- The Russian-Kazakh explanatory dictionary Physics [7];
- The Russian-Kazakh explanatory dictionary in Electrotechnics [8];
- The Russian-Kazakh dictionary of terms in Engineering Branches [9];
- The Russian-Kazakh dictionary on metrology, standardization and patent science [10].

Research of the German-Russian terms in electrotechnics was not revealed that been carried out confirms our opinion that electrotechnical terminology the subject of detailed analysis.

We found 1 (one) dictionary of abbreviations of the German language has not been units, 1958 year of edition, republished in 1964, containing 7 entries in electrotechnics. There is no separate dictionary of abbreviations in electrotechnics. Therefore, our aim goal is compile a German-Russian dictionary in electrotechnics, and also a German-Russian dictionary of abbreviations in electrotechnics.

To analysis the specific features of the German language terms in electrical engineering, a selection of 2302 terminological units has been carried out. The sources for selection were journal publications, linguistic dictionaries technical dictionaries, manuals and Internet materials.

ISBN: 978-605-64453-0-9

4. Discussion and conclusion

In our opinion, the terms that were included in selection are the most important terms of the sublanguage of electrical engineering. The general scientific lexical units found in any scientific work, i.e. the words, which represent the terms functioning in several areas of science and technology and expressing concepts of a wide profile have been included into our sample only as components of terminological combinations.

Thus, for instance, 54 multicomponent terminological combinations whose structure includes general scientific words characteristic of the German and Russian languages, have been included in our sample selection.

German TC	**Russian TC**
Modulation $_f$***:***	***Modulyatsiya:***
Amplitudenmodulation $_f$	- amplitudnaya modulyatsiya;
Anodenspannungsmodulation $_f$	- modulyatsiya i anod;
Gegentaktmodulation $_f$	- balansnaya modulyatsiya;
Generator $_n$***:***	***Generator:***
Hochfrequenzgenerator $_n$	- generator vysokoy chastoty;
Schallfrequenzgenerator $_n$	- generator zvukovykh chastot;
Sägezahnspannungsgenerator $_n$	- generator piloobraznogo napryazheniya;
Röhre $_f$***:***	***Stabilizator:***
Glättungsröhre $_f$	- gazovyi stabilizator
Gasentladungsröhre $_f$	- gazovyi razryadnik;
Spannungsstabilisatorröhre $_f$	- stabilizator napryazheniya;
Doppelgitterröhre $_f$	- dvukhsetochnaya lampa;
Kapazität $_f$***:***	***Attentuator:***
Kapazitätsattenuator $_m$	- yomkostnyi attentuator;
Kapazitäts – Messtufe $_f$	- yomkostnyi attentuator;
Kapazitätskopplung $_f$	- yomkostnaya svyaz’;

As it appears from the mentioned examples, given the general technical terms make up the core of terminological combinations, thus becoming part of a concrete sublanguage, in our case - part of the language for electrical engineering. Therefore, they receive a new terminological meaning. For example, the general scientific term «Widerstand» in above mentioned terminological combinations has the general scientific meaning "resistance", but in the given terminological combinations it is concretized, as it is used for describing modes of strengthening systems (a rheostat, the resistive amplifier).

Going back to the second and fourth points of requirements at for compiling terminological dictionaries it would be logical to focus especially on one of the major problems of modern science of terminology – phenomenon of synonymy.

The modern linguistics abounds in a variety of points of view about essence of synonymy; there is no precise definition of the concept of a synonym. Some researchers recognize presence of terms-synonyms while others deny their existence. Certainly, synonymy is a undesirable phenomenon in terminology; however its existence is obvious.

U. Kuain considers that synonymy is based more on verbal equality, than on the true state of things.

Zh.Maruzo [11] in the Dictionary of linguistic terms describes semantic doublets, for instance, latin “Reditus” and “reditio returning”. Synonyms and doublets are not the same. According to the opinion of the linguist, synonyms are different words, doublets - variants of one and the same word. Therefore one of the major problems of organizing of any terminology is distinguishing

ISBN: 978-605-64453-0-9

synonyms and doublets.

In our work we carry out our analysis of synonyms of the given sublanguage from two angus:

1) their belonging to intrabranch or interbranch terms;
2) number of terms in a synonymic set (row).

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ISBN: 978-605-64453-0-9