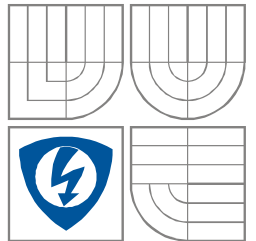


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ABSTRACT

The Core of this Commented translation bachelor thesis is the translation of a scientific text from the magazine *Energo*, which focuses on the field of electrical engineering, mainly the technology of the power supply. A commentary on the differences between the source text and the target text is presented. The topics of transmitting information, cohesion, terminology and localization are discussed. In addition, particularities of the scientific style are debated.

KEYWORDS

Translation, scientific text, linguistics, means of expression, coherence, pragmatics

ABSTRAKT

Bakalářská práce se zabývá překladem odborného textu z časopisu *Energo* zaměřeného na elektrotechniku, konkrétně obor energetiky. Ze vzniklého textu je vytvořen komentář za účelem analýzy rozdílů mezi originálem a překladem. Součástí je diskuze o přenosu informací, kohezi textu, terminologii a lokalizaci. V práci je také část věnovaná podrobnostem odborného stylu.

KLÍČOVÁ SLOVA

Překlad, odborný text, lingvistika, vyjadřovací prostředky, koherence, pragmatika

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1.1 Prohlášení

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V Brně dne

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(podpis autora)

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INTRODUCTION

Translation is a complex task of transferring the source text into the target text. Along the way we may encounter many limitations, for example the message can lose some of its meaning due to the cultural and linguistic differences or issues with equivalence. We should avoid mechanical translation and capture the practical meaning of the source text in a way that allows for free communication between the two cultures. This creates a challenge for the scientific style writing according to House (2009: 29), because precision and formality is more important than well written albeit less accurate text. In the commented translation we are able to delve into the translation process, we have the opportunity to study and discuss each part of the text separately. A distinctive feature of this work is the focus on the use of the professional discourse in electrical engineering. This work will look into the relationship between the source and the target text and describe the differences of their structure. A set of topics will be discussed when drawing comparisons between the two languages and consequent analysis is also present.

The source text for this work comes from the magazine *Energo*, which is published by Siemens Brno. In a multinational company the majority of materials must be translated into a common language, English. It is the language that everyone is required to know. Frequent cooperation between their branches would not be possible otherwise. Siemens has adopted English like many other companies. English is today's lingua franca and its use is widespread all around the world. It's the language of choice for science and technology, international trade, culture and diplomacy. It is important for the minority languages too, if they are to remain competitive and relevant. Professional discourse in a variety of fields accepted English as its own and that is a positive development with only a few setbacks.

The thesis will discuss the translation generally and then, move into the topic of scientific style, describe its features and talk about English becoming the main language of science. Another topic is pragmatics, where the focus is on the coherence, terminology and mental schemata. The last topic of the theoretical part of the thesis deals with the comparison of localization and translation and another closely tied topic, globalization.

Next part includes my translation of a scientific text from Czech into English. For the main part, it has proved to be a straightforward task. English works well with our mother tongue and

enables for translation of various messages without losing much of the information. Even when adhering to the formal spectrum of translation, the resulting text seems natural and flows easily. This can be explained partly by the use of loanwords. Czech absorbs a great deal of terminology from English making the translation back easier. Another explanation might be the style used by the writers. The text comes from a magazine focused on electrical engineering and the assumption is that their writing style mimics the structure of the German or English texts.

The content of the next chapter of my thesis is a commentary on the translation of the four articles. All of them belong to the field of electrical engineering and as the name of the magazine suggests, it is about power distribution. The fields of electrical engineering and its translation have a long history which means that all the terminology already exists. The articles that deal with new advancements in the field don't require any new terminology, most of the new technology is redesigned or reconfigured old technology and that makes translation more straightforward. A rare occurrence of a term without a Czech equivalent doesn't create a problem either. The use of loanwords aids with the text to remain comprehensible.

English influences the language of professional discourse in many fields and the Czech language is no exception. In this thesis, various qualities of both languages are discussed. English is lingua franca and this position cannot be challenged. Conveying messages simple or complex, from general statements to very specific reports, everything is available for native speakers and many second language users. In this regard, Czech is very similar, but limited to our country. Translation in a great part drives the evolution of our mother tongue. Through this thesis, we would be able to see if that evolution makes Czech relevant in today's world.

PART ONE

2 THEORETICAL CONSIDERATIONS

This chapter deals with the choices that are presented during the translation. Focus is on the professional discourse in electrical engineering and trends that influence the translation industry. Pragmatics will also be discussed.

2.1 Translation

Translation by its nature provides access to a message that already exists and therefore is a secondary communication. Unfortunately, in this regard it can be perceived as an inferior substitute, according to House (2009: 3). However, the target text (TT) is available to the audience that wasn't able to work with the source text (ST). This makes translation a valuable tool for overcoming the barriers built by the cultural and language differences. From this point of view, translation is more important than the original, allowing everyone to participate. The effect of this trend is vital for globalization and creating more equal world, where the free flow of information is possible.

When comparing the contents of the source text (ST) and the target text (TT), the message should be equivalent but this means a vastly different approach in various genres. According to House (2009: 5), there can never be one-to-one relationship between the ST and particular TT, which gives us a certain leeway when translating. It is up to us to decide the right course of translation. For popular scientific style we might produce a TT that is rather an adaptation of ST version, in an attempt to have the most impact on the reader. In professional discourse exact wording often matters and it is better to focus on the accuracy and stay as close as possible to the ST.

A discussion of the difference between languages and its users is best described by the Sapir-Whorf hypothesis. Boroditsky (2001: 1-22) uses the example of the phrase "elephant ate the peanuts" to demonstrate the differences between languages. "In English, the fact that this event happened in the past is included. In Mandarin and Indonesian, indicating when the event occurred would be optional and couldn't be included in the verb. In Russian, the verb would need to include the tense and also whether the peanut-eater was male or female and whether all of the peanuts were eaten or just a portion of them." We can see that different languages express different information about the world. This raises the question about the language users. Are their minds and world views influenced by the particularities of their own languages?

According to Whorf (1956), thoughts and actions are determined by language. This view has been abandoned but the idea of the language shaping thoughts is yet to be resolved. Some studies confirm this idea (Boroditsky, 2001: 1-22); Bowerman, 1996: 145-176) while others are against it (Heider, 1972: 10-20; Li and Gleitman, 2002: 265-294). The research on this topic is an ongoing process and we will take into consideration some of the categories presented.

There are differences in the way people in various cultures perceive spatial relations. Several conclusions are made by Boroditsky. Studies show, that English speakers tend to produce both relative and absolute responses to the given test while Tzeltal speakers chose absolute responses, which could be attributed to the lack of relative terms in their language. "There is also difference in the time perception, the English speakers tend to construct horizontal timelines, which confirms that language is an important tool for shaping thought," continues Boroditsky. Another distinction is for describing substances and shapes. In English objects like chairs have defined singular and plural forms (one chair, two chairs), but substances like oil do not. For these, units of measurement are used such as gallon of oil or barrel of oil. Languages also consider the features like grammatical gender. Studies proved (Boroditsky, 2001) that objects attributed with gender shape the way people describe them. If the object has feminine gender, words used to describe it are lovely, little, shiny and for masculine gender word like heavy, hard and useful were used. Boroditsky concludes that even the smallest attributes of language affect the way we perceive the world.

There are more contributing aspects to the way we think about the world. We could consider the differences in perception of numbers, events, colours etc. Such studies confirm that there is a gap between cultures and we are still in the early stages of defining the particular differences. But the focus might shift the opposite. Ultimately, we will be able to determine what is shared and universal in our thinking, which will result into the categorization of our cognition.

The idea of equivalence opens up new options for the translator. The TT doesn't need to be close to the ST, as the information can be transmitted in multiple ways depending on the context. Using cultural equivalence will produce a text that is appropriate to the TL and will feel less like translation. According to Newmark (1991: 3), there are varying degrees of the text closeness, paraphrase and synonymy are straying from the ST, while componential analysis, modulation and descriptive equivalent are close. Such categories allow us to decide the line where the text equivalence, correspondence and adequacy lies. When it comes to deciding the correct way of translating, word-for-word translation is the preferred. The need for synonyms

and elegant variations is caprice of the translator. To translate is to contemplate not only the meaning, but also the words and texts altogether. Every part of the translation process should take every character of the ST in consideration even if some of them will not appear in TT.

It is crucial to have descriptive terms which help us with comparison of the texts. When confronted with the artificiality of translating, Newmark (1991: 65-66) talks about translator considering the textuality, reference, cohesion and naturalness, which are the parameters that help to decide the deviation of the TT from the ST. Another important descriptive unit is: text, paragraph, sentence, group, word, morpheme. While there are many words that can be translated one-to-one, the translators often deviate from the ST and being able to pinpoint the issues with correct terms contributes to higher quality translations.

Eugene Nida (1964: 159) distinguishes between the formal equivalence and dynamic equivalence, when the former is more appropriate for scientific discourse, because we have to stay close to ST, avoiding any shifts, but possibly sacrificing the flow of the message, resulting in a somehow unnatural text. The latter is more appropriate for the popular scientific writing as the main focus is on engaging the reader and conforming to his cultural realities. Another topic for translators is also invariance. This refers to the components of ST that are crucial to be conveyed in TT. This creates a common ground between the texts and helps to decide their equivalence. There are more types of equivalence according to Koller (1995: 196), like pragmatic, connotative, formal-aesthetic, etc. So it is clear that the translator has to choose which of them to follow, because some of them are incompatible.

According to House (2009: 34), the analysis framework for equivalence can be broken into three categories: field, tenor and mode, which are the dimensions of the context of the situation jointly characterizing a particular register or segment of the language in use. Field describes what the text is about and its contents. Tenor specifies the relations of the participants. Mode is about the way the text communicates. Altogether, we can use these methods to decide the functional profile of the text and with the information about cultural context, genre can be determined, House concludes.

In conclusion, with the framework we can use, the quality of translation can be evaluated. The translation of a scientific text is distinctive because of the constraint on meaning, it must be transmitted with maximal accuracy. Different languages can never be transferred perfectly, the resulting text is close equivalent in some aspects, but the divide between the cultures forces us to consider different angles when translating. A great basis is provided by the work that builds on the Whorfian hypothesis. Only when we define the limits of translability with various

linguistic tools, a high quality translation can be produced.

2.2 Stylistics

Before entering specifics of the style of professionals, it is useful to map the way in which various styles are used. By style, according to Verdonk (2002: 3) we understand “a distinctive linguistic expression and stylistics is then the analysis of distinctive expressions in language and description of its purpose and effect.” In the case of the *Energo* magazine, the publisher has to know the audience to which the text is tailored. The particular context is important for each article and even the properties of the text like typography, sounds, phrases and sentences have to be considered. The resulting text is then a reference to the reader’s world and represents a certain point of view that is imposed on the audience. There is also a difference between the discourse produced and the discourse the reader is able to observe. In our case, the retention is increased by the formatting and visual cues. Some of the information is also summarized in tables and graphs that are present in some of the articles.

“When considering the text, either given or new information is presented to the reader”, Verdonk (2002: 37). The given information refers to the information that the author assumes is already known to the addressee, either from linguistic or situational context. Building on top of that, we have new information. Here, the author assumes that the addressee cannot have acquired the information previously. In the *Energo* magazine new information is presented, but for the considered target audience novelty is minimal. Stylistics is then a discipline that outlines the processes that we use in discourse analysis. Pragmatics and semantics provides us with a variety of tools for analysis.

2.3 Scientific style

A professional discourse has many varieties in different branches. The purpose of scientific style is to convey exact scientific knowledge to people already acquainted with the subject. Most common form for this style is written and is often tied to academia. Examples include: essays, articles, textbooks or scientific studies. Another form include spoken word and monologue. Features of this style include precise, formal statements, stereotypical structure, logical hierarchy and impersonal character. Figures and illustrations are often present. So are quotations and references to other works. Frequent use of terminology and bookish words.

It is important to distinguish between the scientific style and popular scientific style, the latter is intended for general public and as such is somewhat simplified and lacks specific terminology. Its function is to provide information about the development in various scientific fields for laymen. There is almost no specific terminology in popular scientific style and terms are explained or demonstrated. There are no prerequisites demanded to achieve comprehension, the goal is science popularisation.

“English has become a professional language in electrical engineering used globally by experts and students sharing their scientific interests” Krhutová (2009:27). The leading role of USA and previously the British Empire spread the use of English all around the world and that subsequently allowed for international co-operation of experts, which wasn't previously possible at this scale. The positive impact can be seen in the Czech professional discourse, many scientific terms are adopted into Czech and the use of loanwords has added benefit of enhanced comprehension for the user. Examples of loanwords: *skener, internet, server, PC, IT, port, flash, USB, web*. In the future, many more loan words will be added as they can be easily incorporated.

2.4 Pragmatics

While the focus of syntax and semantics is on the language and relations within it, pragmatics focuses on the reality we live in. Yule's (1996: 3) definition: “Pragmatics is concerned with the study of meaning as communicated by a speaker (or writer) and interpreted by a listener (or reader). It has, consequently, more to do with the analysis of what people mean by their utterances than what the words or phrases in those utterances might mean by themselves. Pragmatics is the study of speaker meaning.” Part of this is also the interpretation of meaning for particular contexts and its influence. The structure of utterances is taken into consideration as pragmatics is also the study of contextual meaning. “To communicate effectively we also need to think about things that are left unsaid. Pragmatics is also about invisible meaning, the study of how more gets communicated than is said,” Yule continues. The fourth area that is mentioned is the expression of distance. The determination between the things that are said and unsaid to provide a shared experience between the readers.

“We have to be aware of both linguistic and extra-linguistic means to produce appropriate comprehension and interpretation of specific information” Krhutová (2009:92). This means that correct comprehension also relies on the knowledge of speaker and his background. In

conversations, having specific context for the given situation is needed. Pragmatics is the study of the dynamic and unpredictable nature of the discourse.

The traditional distinction looks into pragmatics compared with syntax and semantics according to Yule (1996: 23). Syntax considers only the linguistic forms and does not include the users and refer to the world. Semantics makes connection between words and the world. Pragmatics considers also users of the language, which translates into better understanding, but for the price of increased complexity of analysis.

2.4.1 Deixis

Deictic expressions are used to “point” through language. They can be used to indicate people (person deixis – me, you), locations (spatial deixis – here, there) or time (temporal deixis – now, then). Interpreting these expressions demand for a shared context between the speaker and hearer. Yule (1996: 16) concludes: “Pragmatic interpretation depends on the context, the speaker’s intention, and they express relative distance. Given their small size and extremely wide range of possible uses, deictic expressions always communicate much more than is said.” Overuse of deictics in professional discourse can degrade the impression of the text. By providing the reader with specific phrases and words (*block of guard, blackout*) in a repetitive manner can improve the retention of the text as the vital words are repeated for the reader to better memorize. Resulting text may sound unnatural, especially to the Czech reader. In English it is permissible to use the same words in consequent sentences. In contrast, Czech is prone to use deixis more as the same practice is considered stylistically wrong.

2.4.2 Coherence

During translation coherence is another concern. It is described by Trask and Mayblin (2004:39) as “The degree to which the text ‘makes sense’“. It is more about cultural knowledge and mental processes than explicit discourse markers. Cohesion is the device that joins a particular sentence together. Coherence is demonstrated with the following example:

For me, the worst thing about waiting tables was the uniform. At the last place I worked, all the waitresses had to wear an ugly brown stripped jumper. Underneath it we had to wear even uglier polyester shirt. Sometimes someone I knew would come in and I'd feel embarrassed by my outfit. Now I have a job in an office, where I can wear my own clothes.

[taken from the Colorado State University writing course]

In this example, we have a strong coherence formed by the continuity of the information presented. Another important factor is the general knowledge which plays a role in the correct interpretation of scientific texts. Comprehension cannot be controlled by linguistic means wholly, we must take the extra-linguistic means into consideration.

Another way to look at cohesion is through the functional sentence perspective. According to Iaroslav from the blogonlinguistics (2013), in English the theme is the semantic point of departure of a clause about which some information is provided. The rheme is the destination where presentation moves after the departure point, as in following example:

Communications device can process data from up to eight devices. (p. 28)

Underground wiring is typically used in urban areas which complicates the replacement. (p. 32)

Typically, the theme is at the beginning of the sentence (“Communication device”, “Underground wiring”) and the rheme is represented by the rest of the sentence. Looking at discourse from the functional sentence perspective point of view allows for a better analysis of texts of various sizes. Theme introduces the local context and defines circumstance, process or a participant. The rheme specifies further what is presented by the theme.

2.4.3 Reference and inference

The assumption about the use of words to refer to people and things is easy for people but it is rather difficult to explain how it’s done. According to Yule (1996: 17): “... reference is an act in which a speaker, or writer, uses linguistic forms to enable a listener, or reader to identify something” and those forms are called referring expressions. Their use is based on the assumptions of the writer about the information the reader knows. An example might be a mention of a circuit breaker in one sentence and in other sentence a reference (“it”) can be used. We must also understand the role of inference. Yule (1996: 17) continues: “Because there is no direct relationship between entities and words, the listener’s task is to infer correctly which entity the speaker intends to identify by using particular referring expression. It is not unusual for people to want to refer to some entity or person without exactly knowing which “name” would be the best word to use.” We can think of the inference as the ability to decode the pragmatic meaning of the reference. Reader uses his previous knowledge and schemata and arrives to a conclusion.

The discourse in real world is more complex, so we have to keep track of multiple sentences and references. The use of subsequent references is known as anaphora. The second expression is termed as anaphor and initial expression is the antecedent. An example:

Prepare the measuring device and connect it into the circuit.

The “measuring device” is antecedent in our case and the “it” is an anaphor referring to the antecedent, which is usually a noun phrase.

2.4.4 Terminology

Scientific writing is distinguished by various parameters, one of which is the presence of terminology. It also creates a divide between the professionals in the field and laymen. “Pragmatic meaning of scientific text is supported by high occurrence of technical terms” Krhutová (2009:107). This results in a systematisation of the discourse. For translator, this creates a base of knowledge to work with. Also documentation is filled with terminology and can be used as a tool by the translator, either to gather more information or to get acquainted with the field. The language used in the professional discourse is the Language for Specific Purposes (LSP). The focus is on education and training for the discourse in particular fields. It is convenient to demonstrate the various levels of LSP on L. Hoffmans’ model.

	Degree of abstraction	Linguistic form	Environment	Communication carrier
A	Highest	Artificial symbols for elements and relations	Theoretical basis sciences	Scientist ↔ scientist
B	Very high	Artificial symbols for elements, natural language for relations	Experimental sciences	Technician ↔ technician
C	High	Natural language, great amount of terms, strongly deterministic syntax	Applied sciences and technology	Technical ↔ director of production
D	Low	Natural language, number of terms, relatively free syntax	Material production	Director of production ↔ skilled worker
E	Very low	Natural language, some terms, free syntax	consumption	Production representative ↔ commerce representative

Coleman (1989: 92)

We can see that there is also a significant difference between the various LSP levels. Professionals in particular field are divided by the purpose they serve and therefore are distinguished in their discourse also.

Terminology is tied to specific knowledge in the particular field for the user. The term gives precise definition to a concept, phenomenon or entity. Krhutová (2009:109) classifies terms into three categories:

- 1) General scientific terms (analyse, classify, research)
- 2) General technical terms (processing systems, computing machines, semiconductor)
- 3) Branch-specific electrotechnical terms (output stage, cache, Fortran)

General terms can be understood by laymen and used in the popular scientific style, branch-

specific terms can be understood only by instructed reader that belongs to the particular field. In the Czech language loanwords are one the most frequently used sources for expanding the vocabulary. Terminology used in professional discourse is a great part of this process. Adopted words are often incorporated without translation or with little changes. This has a positive effect of improved orientation within the text for a reader that doesn't fully comprehend the material. Many of the loanwords used for specific purposes in a scientific field has moved into general knowledge, the reason for that is increasing prominence of technology in our everyday lives. Examples of that are: WiFi, root, HDR, ISO, torrent, blockchain. Terminology is a crucial part of professional discourse and in a way it is a centre around which all conversation revolves.

2.4.5 Mental schemata

“Schema is a pre-existing knowledge structure in memory” (Yule 1996: 85). Previously acquired knowledge which is organized in schemata then influences the way we produce new content and knowledge. Focus on the scientific text requires specific education or experience in the given field, which in a way makes translation easier as we can turn to the field specific manuals and dictionaries. An educated reader is able to comprehend the message, he already knows the terminology and has the mental schemata that are connected to the topic.

“An interesting quality functioning in English for Electrical Engineering within a Czech group of experts can be identified and facilitates comprehension: English loanwords used as branch-specific terms in Czech support the mental professional schemata when reading original texts by reference to Czech texts on electrical engineering”

Krhutová 2009: 106

Frequent use of terminology from foreign languages gives language user a broader base of knowledge, the different languages use the same terminology which is a positive trend for overall progress in science and technology.

Schemata then create a framework which helps with absorption of information. These particular structures are also resistant to distortion, when a schema is reinforced its use is effortless and categorization of information is accurate. When incorrect schemata is present, its removal can be problematic.

2.5 Localization and globalization

In the present digital age, we have a variety of flexible translation tools at our disposal. Words and text can be easily transferred into binary code, which in return influences the way we see translation today. To avoid pessimistic outlook on the situation, we should better understand the limits that are present in the digital translation. “There is a point beyond which the convertibility cannot go”, according to Cronin (2013: 3) and the tools at our disposal make positive impact on the society although they require a shift in paradigm.

Localisation involves taking a product and making it linguistically and culturally appropriate to the target audience where it will be used and sold. The line between localisation and translation is blurred nowadays, there has been significant growth in demand for globalized products. Software industry in particular is driving this trend. The result is a shift in the way translation is perceived. For example, a software product has to have various localized versions and with that comes the translation of manuals, which should be very close in meaning for every version and then there is the translation of the product itself. Often word-for-word translation is possible because it is intended for educated audience. But how do we approach the advanced features of the user interface? Keyboard shortcuts should mimic the titles of functions they are tied to, but then localization might fail to do so. The dilemma is whether to option for the same behaviour of shortcuts for every localised version or mimic the translated terms and create completely different shortcuts. This might create a divide between users of different localized versions and possibly make cooperation confusing.

The main concern is functionality and role of the ST is moved into background. Translation is often produced from interlingua version, which is an internationalized ST that is streamlined for translation into various languages. The effect of such practice is commercialisation of translation and perhaps lower quality of the text. We must bear in mind that there is a competitive market and regulations and deadlines must be followed. Sometimes the translation is produced when the ST is still being formulated. High quality of such localization can be then achieved only through close cooperation between the translators. It is of great advantage when the translator is a capable corrector, the process is complicated as it is, adding more people into the equation could lead to more errors and inaccuracies.

According to Witalisz (2011: 3) “Globalization has tremendous impact on the world and translation has taken a prominent role in it.” Emergence of internet has revolutionized the information flow and redefined the role of the translators and the way living is made in this

profession. This leads to emergence of a network of translators all around the globe, which helps with bringing down language barriers and allows for unprecedented productivity growth. Like railroads brought progress in 18th century USA, translation does the same on global scale. There is no future in isolation from other cultures and nations. Unity through language creates a better and more tolerant world.

English, being a lingua franca spreading into more countries has some downturns too. For established translators work may become scarce, as agencies prefer to contract translators from lower wage countries. “Minority languages are threatened by major international languages and translation has a positive as well as negative value”, remarks Cronin (2013: 44). Translation makes these languages relevant in today’s world and as such must be regarded as important component influencing the culture, values, economy and viewpoint of societies. Furthermore, translation reflects our view of the world and enables our future development. It is unfortunate that this profession is currently underappreciated financially, the benefit it provides for whole countries can be seen at every point. With uneasy doubtful thought Cronin (2003: 54) concludes: “Are translators, as incorrigible nomads who resist the confining lure of the local, not by definition sympathetic to the globalizing project?”

2.6 Machine Translation and Computer-Assisted Translation

With the advances in the information technology, the idea of translation machines could be realized. The barriers between the nations are melting, but the language is one of the most important aspects of cultural identity. This results in high demand for human translators that is not satisfied. A solution is presented by using machines to translate, but that is by no means a perfect solution.

Machine translation is interesting in theory, but real world application falls short of promises. Its aim is to gather a library of all necessary information in one program and then translate accurately without human intervention. This means that the computer has to understand the text on the semantic, pragmatic and syntactic levels etc. This is by no means an easy feat, given the complexity of human interactions. We can think of translation as a two-stage process, the first stage consisting rough text that is later polished in the second stage. Machine translation is capable of producing the first stage text for the translator to work with. This poses a problem, it is easy to overlook the mistakes in a text that very much resembles the final version. Computer-Assisted Translation provides the translator with a variety of tools that streamline the translation process so the role is closer to that of an editor. In translation of the *Energia* magazine electronic dictionaries, glossaries and terminology databases were used. While paper dictionaries provide the same functionality, the convenience of its electronic form speeds up the whole translation process immensely. The availability of thesaurus has also a great impact on the quality of text. When confronted with a problem, it is always possible to seek alternative ways of expression to better fit the needs of the audience. There is no doubt information technology is making translation more efficient, but the limitations are obvious. Some genres are absolutely impossible to translate with computer, but texts in electrical engineering can definitely accommodate the use of computers. For translation of data sheets it is probably always better to use machine to reduce the strain on translator, which can focus on more demanding tasks, like editing the texts that are only moderately accurate according to Shahabbi (2016: 71-75).

PART TWO

3 TRANSLATION

This chapter comprises of four translated texts from magazine *Energia*. All of the articles are about various components and methods prevalent used in the power supply chain.

3.1 Compact circuit breakers

Electric energy distribution system

A new series of circuit breakers 3VA are an innovation of the Siemens Sentron product line for low-voltage electrical wiring in buildings, infrastructure and industrial applications. New circuit breakers allow for higher efficiency of energy consumption and faultless operation.

This circuit breaker is used all around world: in large civil and commercial buildings and manufactures too. Each year sees installation of approximately 30 million of this type of circuit breakers. They are one of the most important safety measures as they safely switch off supply voltage for protection of wiring, electrical machines and industrial manufactures in the case of fault, i.e.: short circuit or overload.

Short circuit and overload can damage electrical equipment, which can result in a stop of manufacturing. Machines are becoming more complex, which means the requirements for designers, assemblymen and service workers increase. The requirements also increase for consumption monitoring or other tasks linked with handling and it all starts in the phase of the design of technical solution. With more competition the burden of cost and complexity of machines is becoming a larger issue.

Modular and flexible construction for a wide array of applications

The compact circuit breakers 3VA have optimal support via a sophisticated modular and highly variable system at every step of process, from installation to usage. The circuit breakers are provided for use in distribution system of commercial buildings and control units of machines in industrial manufactures in various set ups up to 630A and can be even installed in smaller spaces. More than five hundred variants of accessories allow for configuration of 3VA circuit breaker for almost any usage. For dealing with various operational requirements, seventy supplementary functions are available.

New machines of the 3VA1 line are supplied in many versions, including single pole to quad pole versions, and for the 3VA2 version in three pole and quad pole option. Circuit breakers are designed for currents of 16 to 630A and AC voltage of 690V. Machines of 3VA1 series are suitable mainly for switchboard and machine protection. The circuit breakers have thermo-magnetic trigger (TMTU) and provide not only all of the protective functions but at the same time are the smallest type of compact circuit breaker with breaking capacity of 70kA/415 V AC and dimensions of 130 x 70 x 70 mm. Basic trigger for protection against overload or short circuit is suitable for the use in AC and also DC power systems. Circuit breakers 3VA1 are easily installed in solid installations and also in plugin modular technologies.

For more demanding technical requirements, the 3VA2 circuit breaker has been used, with high switch off capacity up to 150 kA, electrical switch-off in case of current overdraw and if requested, with measuring and communicating functions. Electronic switches (ETU) provide reliable protection from overdraw and short circuiting, the protection of neutral conductor and the protection against ground current. Parametric equations and testing can be carried out on spot with a mobile testing device.

Savings in energy expenditure and system transparency

Accurate measurements and evaluation of consumption readouts is vital for saving up on energy costs. The function of energy readouts, used for the first time in compact circuit breakers 3VA2 enables for a voltage and current measurement and other energy parameters and system status. To save up time it is necessary to use plugin devices with external conductors for external measurements or to install external current transformer. Communications device can process data from up to eight devices. They can be connected via Profibus network, Profinet network and industrial ethernet to the system of higher control level of energy and automatization. With the use of plugin display unit, the levels of current can be displayed on the doors of the

distribution system. Recorded energy values, regular information about the state and fault or warning messages improve the control of the system and efficiency of energy consumption. At the same time, it is easier to detect and remove malfunctions.


Safe installation and operation, time saving at configuration

Modules like triggers or supplementary and signal contacts report critical states of the system to superordinate control systems. In an event of failure the complete selectivity of circuit breaker ensures that only the machine in place before the failure is switched off, whilst other parts of the system can operate as usual. The use of block of current guard (BCG) plugin allows to find out other failures and safely disconnects the device. This results in reduction of serious failures and blackouts to minimum. Circuit breakers can be easily and safely used thanks to intuitive and ergonomic design and built-in pilot lights and displays. In a scenario of reduced visibility an optional set of backlight helps with the visibility of breakers. Various options for blocking prevent undesirable manipulations. Internal components can be installed into models of all sizes and are distinct mechanically and in colour. They are connected to visibly marked slots. In this way, the possibility of invalid use is eliminated.

Project to maintenance support

Handy internet services make the design of the system with compact circuit breakers 3VA easier, from the project stage to installation and maintenance. All of the data for the project and configuration can be downloaded. In a matter of seconds, the Cax Download Manager is able to flexibly design up to 12 data sets, including the 3D models, switch off characteristics, EPLAN macros, implement and integrate them into all of common configuration tools. This not only saves you 80% of time in comparison with manual data input, but also evades the errors made when doing this manually.

By scanning the quick response (QR) code on the circuit breaker you gain access to service and support data on internet right from the workplace and there is no need to look for this data on the web or in the documents. This quick access is going to save you up to a third of the time needed – and time is of the essence, especially in the maintenance of ongoing manufacture process.

Compact circuit breakers 3VA	
Type 3VA1	
<ul style="list-style-type: none"> - For standard use in electrical systems - Intended current up to 250A - Smallest Siemens compact circuit breaker – up to 70 kA/415 V AC 	
Type 3VA2	
<ul style="list-style-type: none"> - Intended for technically demanding systems - Intended current up to 630 A - Switch off capacity up to 150 kA with the system of current guard 	

3.2 Wiring diagnostics with LIRA system

Wiring is a basic element of every power grid and that makes the prediction of high-voltage wiring malfunctions an important task. If it is possible to prevent accidents and

forced shut downs, there is a positive impact on economics and safety of running wired networks and energy grids of cities.

It's of high priority and importance in most situations to have fast diagnostics and ability to locate where the fault occurred and especially if there is a need to repair the wiring malfunction as soon as possible to resume the power supply. Time needed to repair these malfunctions mainly depends on the ability to accurately locate the place of malfunction. The modern LIRA diagnostic system enables us to do all of that.

The abbreviation LIRA stands for linked resonation analysis. This unique and complex system is able to decide in real-time, whether with laid cables or at the stage of laying, the location of malfunction, and it doesn't matter if that happened due to the materials used, mechanical wear or outer influence, i.e.: water leaking inside, chemicals, volume changes, high temperature, humidity or radiation.

How LIRA works

LIRA is a system with patented software for calculation and analysis of the wire through the input impedance spectroscopy. All of this is based on the transfer conductivity theory, through assessing and analysing of the complex conductivity impedance as a function of the used signal frequency. To put simply – a signal of precise parameter is sent into the measured cable. Then we measure the time period of the signal return to the diagnosing device. All of the inconsistencies in wiring cause anomalies and at the certain spot the signal is partially sent back to the start of the cable and partially continues further. All of this information is displayed on portable diagnostics device. The important thing is that the measurements are at the same time saved and can undergo analysis at other facility. The results are exported automatically and can be saved as a reference entry.

The LIRA system is a great saver of time, investments and running costs. For the problem of detection there is no need to uncover or dig up the cable. LIRA only needs the access to one end of the cable connected to two conductors or to a conductor and the conductor coating. LIRA system can be used with all types of cables with the length up to hundreds of kilometres and is suitable for multilayer or multi-vein wiring. LIRA is able to localize critical spots with deviation less than 0.3 % of the cable length. Application of the system does not cause any electrical strain to the cable insulation.

The procedure after LIRA detects a malfunction.

Since we could locate the problem without any digging or breaking the walls, it is possible to repair the fault in the same manner. While it is not a major issue to replace or repair overground electric cables, it is much harder to do it underground. Underground wiring is typically used in urban areas which complicates the replacement. A technology has been developed by Siemens in cooperation with the Novinium partner company, to prolong the life cycle of cables by up to several decades without any excavations and heavies.

The whole process of cable renovation is based on filling the insides of the wiring with a special silicone mixture. It is injected into wiring under a constant pressure and gradually fills all of the space between the conductors until the cable is filled to the other end. The silicone mixture in the cable then penetrates over a period of seven days into the original insulation and brings back the former protective attributes. This part of the process can take part while the wiring is under voltage, so it can be put back to work immediately after injecting, which takes only a few hours.

Effectivity and variability

When it comes to all of the undisputed advantages of this method, in particular its time and cost requirements, the ecological aspect is also praiseworthy. There is no need to replace the old wiring with a new one, so they can serve for several decades. The silicone mixture used for the filling of the cables is stable with all the properties, ecologically acceptable and is not flammable, toxic nor carcinogenic. It's composition can be changed depending on the temperature and other outer requirements, depending on the cable placing. Thus to say, every wiring can be treated in a tailored manner.

3.3 AFDU

Lower amount of fires caused by electric energy

The abbreviation of AFDU is for the Arc Fault Detection Unit, a device for detection of electric arch. It is a relatively new type of safety device, which can switch off the creation of series or parallel arch at the end wiring with the magnitude of nominal current of 16A. It's main purpose is to prevent fires that might be caused by damaged electrical devices or installations.

It is truth that we are protected from this kind of danger by multitude of safety measures – fuses, circuit breakers and current protectors. Why also use AFDU?

Electric arch, short circuit is one of the most dangerous malfunctions in electric grids. It can cause a direct threat to crew, damage to the device and blackouts. If a high voltage malfunction happens, well designed devices will cause disconnect quickly and safely. With this we make do with current design of fuses and circuit breakers. In some cases of malfunctions with electric arch a current of significantly lower magnitude appears. We could not detect this kind of malfunctions previously and its containing depended on the abilities of the crew. Because of this, in best case scenario the malfunction changes into short circuit with high voltage and was shut down, in the worst case it has been a cause of fire.

Specific attributes of malfunctions

As mentioned earlier, some malfunctions of series or parallel arch couldn't be detected in time and disconnected by equipment (or combination of) we have now. Some of the mathematical-physical analyses of these complex phenomena showed, that every operating or malfunctioning state which is accompanied by sparking or an electric arch, is characterized by a specific range of high frequency vibrations and the course of voltage and current. This realization lead to the design of a device that can determine the values of operational voltage including the harmonic component, noise etc., to a course that emerges for a parallel of a series arch.

New technology reduces the risks

Current legislation and given technical norms define maximal admissible risk and from that current concept of safety is created. They are accepted standard rules. But in the case of life or a health of several people or assets is threatened, we should focus on lowering the risk even further. From the past, we know tragic consequences of fires in hospitals or hotels, great cultural loses because of fires of archives and museums. We should strive to avoid these situations, especially when we have the right means to do it. From the years of experience in the USA and Canada, which use equipment that reacts to malfunctions caused by series or parallel arch, we see that it is possible.

The Siemens company offers this device as the first for the European market under SSM6 branding.

3.4 TPCA container

Substation Ovčáry 110/22kV in the vicinity of Kolín is undergoing a complete reconstruction. Over the course of repairs, smooth operation is required, because it is supplying many subjects and also a TPCA car factory. Mobile container substation was set up to replace part of 22kV.

An Independent mobile container substation of high voltage has been created to meet the needs of ČEZ Distribuce a.s., and is put to use mainly over the course of reconstructions, or in cases of a substation breakdown and switch stations VN in general.

Locally and also remotely

The control unit and safety measures were provided by Siemens. The System allows for a full-fledged remote control and the local control of all switching elements, disconnectors, switch offs and grounders. The Local control is managed through the control terminals of the individual fields of VN substation. This provides full comfort of controlling, which means protection against faulty manipulation in the scope of the substation ("big blockade"), the record of all manipulations and subsequent events into a safety logbook and also into a dispatching's control system. Power elements can also be manipulated in emergency with buttons, or with lever mechanism on the switchboard.

Head of the control unit

The brain of the control system is a SICAM AK 1073 ACP unit equipped with communication cards for the main and backup communications with of SIROTEC protocol protection terminals, IEC61850, in double optical ring topology. This communication also realises the remote control and service access to do protections and the centre of engineering station. It also includes communication elements (switches, routers), a server of time synchronization, a terminal for the shared faults collection and of backup voltage switch.

System of protection

SIPROTEC deduction terminals are installed in NN additions of individual fields of the VN switchboard. Processed signals from switchboard are paced with the corresponding field terminal, all information between the individual endings are transmitted exclusively via optic fibers. End fields terminals are also equipped with a function of repeated switch on, a special version of operations for working under voltage, automatics for frequency easing etc. A basic operational set up, including safety parametrization for a standardized catalogue of information, commands and measurements was carried out in cooperation of representatives of ČEZ Distribuce, a.s., Siemens, s.r.o., and Schneider Electric CZ, s.r.o. companies.

PART THREE

4 TEXT COMMENTARY

This chapter consists of the commentary on the translation of the ST into the TT. My focus is on general commentary of both texts and then properties and particular features encountered during the course of translation. Discussion on alternative translation possibilities of the final text is also present. The intended audience for the magazine *Energo* are customers and partners of Siemens company, so the overall tone ranges between scientific style and popular scientific style. Readers should have technical background or work in electrical engineering to achieve optimal comprehension. The publisher of this magazine is *Entre*, an advertising agency that focuses on creation and promotion of the company's identity. As such, we can see emphasis on Siemens's achievements, promotion of their products and overall positive tone to strengthen their image. Siemens is a leading technological company so the articles are about their new products and technologies. Frequent use of terminology, field-specific abbreviations and references to electrical engineering theory are present (*LIRA*, *AFDU*, *substation*, *logbook*). The titles of articles are followed by a brief explanation of the topic. In the *AFDU* article a short description of the system attributes is presented before the discussion of possible risks and advantages of the system. Whenever the content of the text requires, a subtitle is added. In the article about *TPCA* container a subtitle is added when the topic changes from safety to the mode of operation and then again with the switch to the topic of switchboard protection. The individual headings include "Locally and also remotely" (p. 34), "Head of the control unit" (p. 34) and "System of protection" (p. 34). Each article has different colour scheme but the text itself is always black. The title is contrasted in white and subtitles follow the colour of the given scheme, but their choice seems to be purely aesthetical. Pictures are relevant to the topic, but are intended as variegation. There are no figures that would provide further technical understanding but some of the specifications are mentioned in the text. In the article *Compact Circuit Breakers*, specific values of currents and voltages for different variants are presented to briefly summarize the parameters and present them in a more convenient manner. Collection of these particular articles should fall under the genre of popular scientific text; the form and relatively low difficulty of the text would suggest so. On the other hand, this publication is intended for professionals and belongs to a specific field within electrical engineering. There are certain similarities with scientific journal, both are read by professionals in their fields, report on new progress and are highly specialized. The result is then a scientific text which has some of the features of popular scientific text. The end product fits the description, it is a

magazine for people involved in this industry but is too specific for general audience.

The translation follows the formal equivalence technique more closely, it is more appropriate for scientific text. The main goal was to translate the ST in a way that retains all the information present and at the same time does not violate any principles of the English sentence structure. Due to linguistic differences of ST and TT languages, word-for-word translation was impossible and several changes were needed as in the following example:

Over the course repairs, smooth operation is required, because it is supplying many subjects and also a TPCA car factory.

Protože ale zásobuje energií nespočet subjektů, kromě jiného například automobilku TPCA, nesmí v průběhu oprav dojít k žádným výpadkům.

Due to differences in the sentence structure between the languages, word order had to be changed. If the sentence had been translated word-for word, it would not make any sense in TL. The choice of words prompts for a short discussion about the effects of the contrasting translations on the reader. In the final text “smooth operation” was used instead of more specific “blackouts”. The former is sufficient introduction and the latter is later introduced in the article. The contrast between these two utterances is also obvious. While “blackout” signifies the complete loss of electric power, the complete opposite “smooth operation” is the complete opposite but still appropriate translation in the given context. The choice for the translator is here whether to choose the positive or negative association. Through this decision, we are able to produce different effect on the reader. Supposed we would like to maintain the positive tone in the article, it would be advisable to avoid the word “blackout”. And similarly, if there is a need to produce an article that has a greater chance of getting the reader attention, “smooth operation” is not good enough. “Blackout” is far more interesting word and catches the imagination of reader which has certainly read about some of the more exciting causes for this phenomena. In the end, the negative connotation of this word could be just the right reason to attract the reader. On the subconscious level, the preference might just be to use “smooth operation”. At some point in the future the reader might recall that he read an article about Siemens and it is better to think of their products as “smooth operating” than “having blackouts”. The publisher doesn't need to worry about catching the eyes of the reader, this is purely about product advertising.

4.1 Encountered properties

4.1.1 Functional sentence perspective

In the structure of English sentences theme is often placed at the beginning of the sentence, whereas in Czech it is placed freely due to free sentence structure. To produce adequate translation we have to work with the sentences from this point of view. The flow of information is controlled by the theme, it is a vital tool of cohesion within the discourse. There were several instances where the word order had to be rearranged to fit the English sentence composition.

Theme (T)	Rheme (R)
<i>Overload</i>	can damage electrical equipment
(R) Elektrické vybavení může být poškozeno <i>přetížením</i> (T).	
<i>The Siemens company</i>	offers this device as the first for the European market under SSM6 branding.
<i>Společnost Siemens</i> (T) jako první nabízí toto zařízení pro evropský trh pod značkou SSM6 (R).	
<i>Shortcircuit</i>	is one of the most dangerous malfunctions
(R) Jednou z nejnebezpečnějších poruch je <i>zkrat</i> (T).	

Theme is presented at the beginning of the sentence, introducing us to the information that is then presented by the rheme of the sentence. The starting points in the examples are short, yet the rest of the sentence depends on them for meaning. In the second example, it is possible to rearrange the sentence into two, which would provide us with two themes and two rhemes for each.

Underground wiring is typically used in urban areas.

That complicates the replacement.

In the second sentence a clause is introduced by the word “that” which refers to the content of the previous statement. In this way it is anaphoric to the subject-verb clause, which becomes its antecedent.

4.1.2 Passive voice

Passive voice is used to shift the focus on action. This is prevalent in scientific style, where

objectivity is vital and the importance of the agent of the action is second-rate. Active voice makes text clearer and easier to read, but it is not used in formal writing. Here are examples, each from different article and the alternative in active voice.

Active	Passive
We used the 3VA2 circuit breakers.	the 3VA2 circuit breakers have been used
Siemens has developed a technology.	A technology has been developed by Siemens
Fire has been caused in the worst case.	in the worst case it could cause fire
We created a high voltage container substation.	mobile container substation of high voltage has been created

In these examples we can see the shifted focus of active voice to the agent of the action. Such rearrangement is undesirable for scientific style, better clarity of the message is achieved by the use of the passive voice that omits placing the agent into the foreground of the sentence. Somewhat distant approach to conveying information enables neutral discourse. Passive voice has been the standard in the scientific texts for the greater part of the twentieth century, but it hasn't always been so. In the classic book by Charles Darwin, *On the Origin of Species*, active voice in the first person is often used. Now there is a tendency to free the constraints of the passive voice and scientific journals like *Nature* even encourage the use of active voice. In conclusion, the importance should be placed on the effectiveness of communication and if it is possible to have quality discourse with either of the voices, then there is no reason to take the option to choose from the author.

4.2 Word-formation in English for Electrical Engineering

The character of words is hard to describe with complete accuracy. Their meaning changes over time and new ones are invented to enable us to produce most fitting portrayal of the world. There are several ways of forming new words, one of the most common is affixation. A suffix

or prefix is added to the root of the word, which enables for a different meaning. By attaching a prefix “on-” and suffix “-ing” to the root “go” we obtain the word “ongoing”. Suffix “-under” forms the word “undergo”. In both cases it changed the meaning, root is still implying some kind of a movement or a process, but affixation enables us to go into more detail. Compounding consists of connecting two or more words to create a new expression. This method is popular in many languages, Czech and English included. Such constructs are then also more than just the sum of the parts. Examples are: *underground, backlight and network*. Conversion is a change of meaning of a word form without any changes in its structure. Example of noun to verb conversion: process – to process, verb to noun: to experience – experience. Then there is clipping that often shortens compound words that are frequently used. An example of that is “tube” which is the underground transportation. Also “ad” is an example of clipping, the full word is “advertisement”. Abbreviations are used to shorten otherwise long groups of words, in the article we have LIRA, which stands for linked resonation analysis or AFDU, which is Arc Fault Detection Unit. Last example of word-formation is the eponym. It is a person, place or thing after which is something named.

Common utterances, which are frequently present in scientific discourse, are called collocations, which are ready-made set phrases (Cowie, 2009: 49), usually verb + noun, adjective + noun or verb + adverb. Examples: *remote control, high voltage, electric arch and power supply*. Usually only a part of the phrase has figurative meaning as opposed to idioms, which have figurative shift over the entire phrase. Their importance lies in providing account on the proficiency of the content producer, higher use of collocations signals competency in language. They convey neutral stance of the author, which is preferred in scientific discourse.

4.2.1 Terminology and context

One of the advantages of translating into English is that the majority of the terms already exist. Terminology is prevalent for scientific style and is supported essentially by the high occurrence of specific technical and electrotechnical terms. They create superior inner coherence and describe conceptual systems (Krhutová 2009: 107). Terminology is densely used in the text, but a great portion doesn't belong specifically to the field of electrical engineering. In today's world, sciences form and interconnected system which is more accessible because of the similar fundamentals. The structure of courses at university reflects that. Students start with the fundamentals and gradually move into specialized roles by the time of the Master's Degree

graduation.

The following is a list of terms from the Enegro magazine, many of which are typical for scientific discourse. The commentary focuses on the meaning of the words and their relations. Computer-Assisted Translation was used to provide the best possible translation and also Thesaurus was employed. Dictionary.com application proved to be immensely useful in the process, providing explanation to every possible word. The origin tab was also useful for determining the roots and relationship between the original and translation.

Translated text	- Source text
Definiton by dictionary.com, discussion, alternatives and comparison	
- low-voltage wiring	- Nízkonapěťové vedení
Voltage is defined as: “an electromotive force or potential difference expressed in volts,” according to dictionary.com. Wiring is an aggregate of wires in an electrical system. The value of the voltage is indirectly specified also, we don’t have the exact numbers, but according to the International Electrotechnical Commission, it could range from 50 – 1000 V.	
- circuit breaker	- jistič
It is a device for interrupting an electric circuit to prevent excessive current from damaging the apparatus in the circuit or from causing fire. If we were to translate the English term word-for-word, something like “ <i>lamač okruhu</i> ” would be crated. This could be an example of the shortcomings of the machine translation which often tends to translate without context. Both of these terms are well established, but a device with same function also exists, “ <i>a fuse</i> ”, which is “ <i>pojistka</i> ” in Czech but looks different.	
- switch off capacity	- vypínací kapacita

In this case we are talking about the maximum possible output that turns off the current in the electric circuit. The ability of the element to perform as specified.

- **electric arch**

- **elektrický oblouk**

Refers to the discharge of plasma into normally nonconductive media such as air. Electric arch was discovered at the beginning of the 19th century.

- **Blackout**

- **Výpadek elektřiny**

A massive power failure in a system resulting in a period of no energy. No work can be done by the affected systems in the meantime. The blackout is a compound word in English and in comparison with its Czech counterpart has simpler structure. Both languages often use compound words, but in this case the source text uses two well established words to describe the phenomena. It would be possible to use the English term in ST as it is used in popular scientific texts.

- **high frequency vibrations**

- **vysokofrekvenční vibrace**

Now we see a compound used in the Czech version. Frequency refers to a number of cycles or oscillations in the system. The adjective isn't defined by any standards so we have no notion about the value of the frequency. Vibration means periodic motion.

- **mathematical-physical analysis**

- **matematicko-fyzická analýza**

Multitude of words have history that goes back to the first civilizations. These three terms originate from Greek and then were adapted by Latin and eventually modern languages. Mathematics, (from Greek *Mathematike*), was generally science, but today is one of many branches in the field. Physics, (from Greek *Physike*), referred to science of nature, which is now an obsolete term, today it refers to the science that deals with matter, energy, motion and force. Analysis, from Greek *analysein* means to loosen up. Today the connotation moved to study, or investigation in a particular field.

- **complex impedance**

- **komplexní impedance**

If we take the words like “complex”, “various” or “mix” on their own, they point to a lower level of discourse in L. Hoffman’s model of LSP. By using such words, specific issues are avoided to provide better understanding. For example, by using phrase “complex issues”, we are able to avoid specificity in the given subject. In a higher level of discourse we could be talking about pragmatic, semantic and professionalism issues. The whole phrase in this example refers to a physical phenomena and thus we are working with a specific terminology. Impedance is the total opposition to the current in a circuit and by specifying that it is a complex impedance, we know it is described in a complex plane.

- **diagnostic device**

- **diagnostické zařízení**

Diagnose come from Greek “Diagnosos” which means “distinguished”. It’s referred to as an act of identifying or characterizations. In both languages the structure of the word is similar, both adapted this as a loan word. Because of that, also the meaning is identical. Device is a thing made for particular purpose. Humans create many things for variety of purposes so both versions are bound to have many synonyms. In English: *apparatus, appliance, contraption, equipment, gadget, gear, invention or machine*. In Czech: *aparát, přístroj, mechanismus, nářadí, přístroj, vynález*. Over time we will probably see more words that describe a device as the definition will slowly shift. Nowadays virtual machines and devices are built on and for the blockchains and will connect to the Internet of things. Such smart devices may be then called by abbreviation s-devices or possibly technology will become so widely adopted that this futuristic devices will still be mundanely labelled as “devices”.

- **Topology**

- **Topologie**

This is an example of a word that was invented to describe a branch of Mathematics, but is only a few centuries old. Means “a collection of open sets making a given set a topological space”. The suffix “-logy” comes from Greek “logos”, which means “to speak”. Both languages make use of this suffix. “Topo-” is Greek also and means “place”. These words are called neoclassical compounds because of the elements coming from Greek or Latin. While these words are conforming to today’s rules, they did also to rules in the past. A word that is originating in Greek could be later slightly changed under the Latin rules and then the German or French until it was adopted by the English.

- **Routers**

- **Routery**

It is a device connected to network nodes to transfer data between computers. The development in the information technology is progressing very swiftly and our ability to describe reality has to adapt also. Oftentimes when a new term is coined in English, Czech loans it without any issues. If the translation was forced, we could end up with something along the lines of “směrovač” or “linkovač” which describe the device’s task, but don’t bring any advantages over simply having a loanword. Phrases like “datový vysílač” or “počítačová spojka” are also right in a way but provide mostly confusion for the receiver. The increasing prominence of IT terms in Czech language is also partly driven by the

secondary language education in our schools, most pupils choose English.

- **quad pole**

- **čtyř pólové**

The use of different terms for numbers complicates the work of translator. The Latin and Greek coined the prefixes un-/uni-, meaning one, bi-/di- meaning two and quad- meaning four. We have to be aware of the circumstances of use to determine the right choice of words, the meaning here is the same, but final effect on the reader varies.

Frequent use of terminology in all of the articles suggests that they are written in scientific style, and variety of terms fit into the three categories described by Krhutová (2009: 109). The sheer amount of linguistic tools for analysis that we have at our disposal enables us to consider all of the aspects of the terms. Given that these terms are taken out of context, a significant part of analysis is then omitted. Let's at least demonstrate an example of anaphora and cataphora.

Electric arc, short circuit is one of the most dangerous malfunctions in electric grids. It can cause a direct threat to the crew, damage to the device and blackouts. (p. 32)

The pronoun "it" is an anaphor which is pointing to the antecedent represented by the "electric arc". The anaphoric reference ties the text together, the second sentence is pointing towards the first. In contrast, cataphora is referring forward in the discourse. The same example is now rearranged to contain cataphor.

Direct threat to the crew, damage to the device and blackouts can be caused by it. Electric arc, short circuit is one of the most dangerous malfunctions in electric grids. (p. 32)

The pronoun "it" is a cataphor that is pointing forward to the postcedent "electric arch". By rearranging the sentence we have changed our terminology for describing this phenomena, but the meaning of the sentence remains the same. In scientific writing it is preferable to use

backward pointing as it is better to introduce a new agent before referring to it.

4.3 Alternative translations

The contents of this chapter are about the different options encountered when translating. When contemplating about the variety of options that are available to the translator, solid knowledge background is needed. Going beyond the thorough education provided at the university, several books paint a better picture of translator's mind. Introducing Translation Studies: Theories and Application by Jeremy Munday (2001: 7) provides a variety of tools to use in translation. Another useful book is Approaches to Translation by Peter Newmark (1980: 6). For the thesis, mostly formal style of translation is present, but alternatives are always possible and from the translator's standpoint, it is important to consider various versions of TT. For a native speaker some of the changes mentioned here would be preferred in the final version. Complete absorption of the mental schemata of the target audience is a skill possessed only by talented translators with experience.

Used translation:

Electric *energy* distribution system

Alternative:

Electric *power* distribution system

Words power and energy are often used interchangeably, they are related and conduct the same message in this instance. Energy is defined as "the capacity to do work" and power as "work done or energy transferred per unit of time" or "the time rate of doing work". Even a dictionary definition puts these two words very close, but in different fields they can mean something different. Power can indicate divinity or control and energy can point to way someone acts or creates.

At the same time it is *easier* to detect and remove malfunctions. (p. 27)

Also it is possible to detect and remove malfunctions *sooner*.

In the alternative version more formal translation is present, but both sentences emphasise the same system abilities with the use of different words. The first version suggests that the result is achieved through the ease of use of the system. The second might imply that use of this system provides superior detection and removal times. As dynamic translation goes, both of the

sentences transmit generally the same information. The customer will obtain a system that is highly functional and well suited for the task.

LIRA is able to *localize* critical spots with *deviation* less than 0.3 % of the cable length. (p. 31)

LIRA is able to *pinpoint* the exact spots of anomalies with *variation* of less than 0.3 % of the cable length.

The use of different words in the second version makes the sentence less natural and would interfere with the flow of text. Words *localize* and *deviation* are more appropriate for this text than the alternative counterparts. Alternative translation is word anomalies that is better suited for scientific text, but a reader can gather the meaning from both versions. There is a problematic spot which is important to the analysis.

The system allows for a *full-fledged* remote control and the local control of all switching elements, disconnectors, switch offs and *grounders*. (p. 34)

The system features *complete* remote control and full local control through switching elements, power disconnectors, switch offs and *earthing switches*.

In the second sentence a more streamlined approach has been chosen, resulting in a target sentence that might be more appropriate for the TT. Lack of knowledge of terminology in the field of electric power distribution may mean that some of the terms are not used appropriately. The translator should take time to study the subject further.

New *technology* decreases the risks (p. 33)

New *device* for decreasing the risks

Traditionally ST is implying that we would be talking about a certain device, word '*technika*' is used and in this case and it is possible to translate it as '*technology*' but then the meaning is shifted. Now it is implied that the paragraph is about a technical theory, which is also true, but given that the article is an advertisement for a finished product, the second translation may be more appropriate.

The control system also includes communication elements (switches, routers), a server of time synchronization, a terminal for the shared faults collection and of backup voltage switch. (p. 34)

It also includes comm elements, a server for time sync, collection log for the shared faults and a backup unit.

In this case the alternative translation is adjusted for a highly trained individual working in the field. The length of the sentence is greatly reduced while keeping all the important information. The control system was mentioned at the beginning of the paragraph so we have a backward pointing anaphor. Abbreviation “*comm*” is often used too and alternative possible meaning like community or committee don’t fit in the context. The elements that are part of the system are also known to the skilled professional so there is no need to describe them. The context and information in the article don’t provide specific knowledge of the abilities of the server so it is not possible to decide whether it is used solely for the purpose of time synchronization or it is one of the functions of the server, which would mean that the alternative translation would be more accurate. If the apparatus serves indeed as a multipurpose server, we can assume that all the faults and crashes would be recorded by it into some kind of log of events. The information about backup unit should be enough for the professional to know that there is a system of reserve energy in case of a malfunction.

There are many more alternatives that could be discussed but the limited scope of this work does not allow for that. To provide complete analysis we must work with the whole article. Even then we must know the context of the writing, its purpose and target audience. For the magazine, it is safe to assume that the readers have a technical background of some kind and the text should reflect that. A printed copy in the lounge of Siemens could be read by the labourers as well management so the level of LSP is low. Thesaurus is one of the most useful tools for the translator. English has around quarter million words and on average a native speaker knows the tenth of that amount. Having the option to choose from a range of words helps immensely with the style and grammar of the resulting TT. With more analysis and knowledge, better translation could be produced, but there needs to be a line between what is good enough and overtranslating. On average a two to three thousand words a day is the rule for a professional translator. The productivity slightly increases when using Computer-Assisted Translation. The speech recognition software enables major increase in translation speed. It is able to handle around hundred words per minute, which is a massive increase over what the average writer can do around, which is sixty words. With the speech recognition software, it is possible to produce thousand words of translation in an hour. But in reality this number is lower as some parts of the text require additional research. If the focus of the translator is on productivity, the best path he can take is to specialize in particular field, then the lost time on research is cut to minimum. When it comes to the translation in the thesis, it does retain majority

of the information presented and is clear enough for the target audience. Changes could be made for the better if more research was done by the author.

5 CONCLUSION

Translation theory is a complex topic tackled by many professionals, so having a collection of rules and governing principles was of tremendous help when working on this thesis. Most of the books available are updated and reflect the state of the translation business accurately. They agree that this field is quickly developing to meet the demands of modern world. Some theories like the formal and dynamic translation are replaced with a more practical theory of functional translation. Others are still relevant thanks to the broad base of topics they cover. Equivalence is a prime example. Cultural differences is another thing for translator to keep in mind. Our mother tongue and lingua franca fortunately cope well with each other, there are differences, for example in the theme and rheme structures: both languages are manifestations of western culture and society, they are tools for describing the similar realities we live in. Professional discourse has been taken over by English and we have to ensure that a free exchange of ideas is possible. When the purpose is to connect professionals, a highly accurate text has to be produced. The comparison between the ST and TT demonstrates the obstacles the translator has to overcome. Both languages are fit to express a wide range of ideas and often in different manner, while keeping the same meaning.

Through the translation of scientific text an observation of limitations of information transfer was possible. English can express all of the meaning present in the Czech ST and vice versa. Translation wouldn't result in any loss of information, provided that a capable translator is present. Since the expansion of the British Empire, English took root into many countries all over the world and is today's lingua franca. Majority of the most advanced countries in the world speak English and that means only further adoption as it is also popular as second language. Nowadays a decent knowledge of English is vital for many professions. It is also relatively easy to translate into it as the vocabulary is vast and up to date. Translating the other way around might be more demanding, frequent use of loanwords in Czech is a practical way around this problem, but then there is the whole complexity issue with our language.

In conclusion, this thesis supports the statement that English is a complex and eloquent conduit for describing reality. Major part of professional discourse is in English and minor languages must allow for an interconnected relationship to stay relevant. Further discussion is beyond the

limits of this work, but it would be relevant to look into the relationship of these two languages when considering different scientific texts produced for different audiences.

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APPENDIX

Kompaktní jističe 3VA

Systém pro rozvod elektrické energie

S novou řadou kompaktních jističů 3VA společnost Siemens inovuje svou výrobovou řadu Sentron pro nízkonapěťový rozvod elektrické energie v budovách, infrastruktuře i průmyslových aplikacích. Nové jističe přispívají k vyšší efektivitě, využití energie a bezporuchovému provozu.

Tyto jističe jsou používány po celém světě: ve velkých obytných a komerčních budovách i výrobních závodech. Každý rok jich je nainstalováno přibližně 30 milionů. Jedná se o jedny z nejdůležitějších ochranných prvků. Bezpečně vypínají napájecí napětí pro ochranu kabelů, elektrických zařízení a průmyslových závodů v případě poruchy, například při zkratu nebo přetížení. Zkraty a přetížení mohou způsobit poškození elektrických zařízení, která v některých případech vedou dokonce k výpadku výroby. Technika je stále složitější, což samozřejmě platí i pro projektanty, výrobce rozvaděčů, konstruktéry, montéry i pracovníky obsluhy. Narůstají požadavky na sledování spotřeby nebo jiné úkony spojené s obsluhou, a to již ve fázi plánování technického řešení. Spolu s tím, jak roste konkurence a zvyšuje se tlak na náklady, začíná být složitost techniky stále větším problémem.

Modulární a flexibilní konstrukce pro široké spektrum aplikací

U kompaktních jističů 3VA je každý procesní krok, od konstrukce po provoz, optimálně podporován prostřednictvím sofistikovaného, modulárního a vysoce variabilního systému. Tyto jističe jsou dodávány pro použití v rozvodnách komerčních budov i v řídicích systémech strojů v průmyslových závodech v různých provedeních až do 630 A a mohou být instalovány v menších prostorech. Více než pěti sty variantami příslušenství umožňuje konfigurovat jističe řad 3VA pro téměř libovolné použití. Pro splnění různých provozních požadavků je k dispozici více než sedmdesát přidavných funkcí.

Nové přístroje řady 3VA1 jsou dodávány v jednopólové až čtyřpólové verzi, u řady 3VA2 v třípólové a čtyřpólové verzi. Jističe jsou navrženy pro jmenovité proudy 16 až 630 A a střídavá jmenovitá napětí 690 V. Přístroje řady 3VA1 se hodí zejména pro rozvaděče a ochranu strojů.

Jističe mají termomagnetickou spoušť (TMTU) a zajišťují nejen veškeré standardní ochranné funkce, ale zároveň se jedná o nejmenší typ kompaktního jističe se spínací kapacitou 70 kA/415 V AC a rozměry 130 x 70 x 70 mm. Základní spoušť pro ochranu proti přetížení nebo zkratu je vhodná pro použití ve střídavých i stejnosměrných sítích. Jističe 3VA1 lze snadno montovat v pevných instalacích i v technologiích se zásuvnými moduly.

Pro náročnější technické požadavky jsou určeny kompaktní jističe 3VA2 s vysokou vypínací schopností až do 150 kA, elektronickým vypínáním při nadproudu a na přání měřicími a komunikačními funkcemi. Elektronické spouště (ETU) zajišťují spolehlivou ochranu proti přetížení a zkratu, ochranu neutrálního vodiče a ochranu proti zemnímu proudu. Parametrizaci a testování lze provádět přímo na místě pomocí mobilního testovacího zařízení.

Úspora nákladů na energii a transparentnost systému

Přesné měření a vyhodnocování údajů o spotřebě nabízí možnost značných úspor nákladů na energii. Funkce měření údajů o energii, které je poprvé použito i u kompaktních jističů 3VA2, umožňuje měření proudu, napětí a dalších parametrů týkajících se energie a stavu systému. Nezbytností se kvůli značné úspoře času stávají přídavná zařízení pro externí měření s vnějšími vodiči nebo instalace vnějšího proudového transformátoru. Komunikační modul zpracovává data až z osmi zařízení. Ta mohou být připojena přes síť Profibus, Profinet a průmyslový ethernet k systémům vyšší úrovně řízení energie a automatizace. S použitím přídavné jednotky displeje mohou být aktuální hodnoty energie zobrazovány přímo na dveřích rozvaděče. Zapisované hodnoty energie, pravidelné informace o stavu a chybové a výstražné zprávy zlepšují přehled o systému a účinnosti využití energie. Rovněž lze dříve zjišťovat a odstraňovat závady.

Bezpečná montáž i provoz, úspory času při konfiguraci

Moduly jako spouště či pomocné a signalizační kontakty hlásí kritické stavy systému nadřazeným systémům řízení. Při výskytu závady zajišťuje plná selektivita jističe, že je vypnut pouze přístroj bezprostředně před místem poruchy, zatímco ostatní součásti systému budou dále pracovat. Použitím přídavného bloku proudového chrániče (RCD) můžeme odhalit další poruchy a bezpečně odpojit zařízení. Závažné závady jsou tak omezeny na minimum stejně jako výpadky celého systému. Jističe se ovládají snadno a bezpečně díky intuitivnímu a ergonomickému designu a zabudovaným kontrolkám a displejům. V podmínkách se sníženou viditelností zajišťuje viditelnost polohy manuálně ovládaných jističů volitelná souprava podsvětlení. Různé varinty blokování brání nežádoucím manipulacím. Vnitřní příslušenství

může být instalováno do modelů všech velikostí a je barevně a mechanicky odlišeno. Zapojují se do zřetelně označených slotů. Tímto způsobem je již na počátku vyloučeno chybné použití.

Podpora od fáze projektu po údržbu

Užitečné internetové služby usnadňují návrh systému s kompaktními jističi 3VA, od projektování přes instalaci až po údržbu. Veškeré technické údaje pro projektování a konfiguraci lze stáhnout. Během několika sekund je CAx Download Manager schopen pružně sestavit až 12 datových sad včetně 3D modelů, vypínacích charakteristik nebo maker EPLAN, implementovat je a integrovat do všech běžných konfiguračních nástrojů. Tím nejen ušetříte až 80 % času ve srovnání s manuálním vyhledáváním údajů, ale také se vyvarujete chyb vzniklých při manuálním zpracování dat.

Oskenováním QR kódu umístěného na jističi získáte přístup k servisním a podpůrným datům na internetu přímo z pracoviště a nepotřebujete tyto informace hledat manuálně v dokumentaci nebo na internetu. Tento rychlý přístup vám ušetří až třetinu času – a času není nikdy nazbyt, zejména při údržbě během probíhající výroby.

Diagnostika kabelů systémem LIRA

Kabely jsou základním prvkem každé energetické sítě, a proto je predikce poruch vysokonapěťových kabelů v mnoha ohledech klíčová. Pokud se podaří předejít haváriím a nuceným vyřazením z provozu, má to významný pozitivní dopad na ekonomiku a bezpečnost provozu kabelových vedení a městských energetických sítí.

Velmi důležitá a vysoce prioritní je ve většině situací také rychlá diagnostika a lokalizace poruchy kabelů, především když je nutné v co možná nejkratším čase opravit porušené části kabelového vedení, a tím obnovit dodávky elektrické energie. Doba potřebná na opravu těchto poruch závisí zejména na přesné lokalizaci poruchy kabelu. To všechno umožňuje moderní diagnos-tický systém LIRA.

Pod zkratkou LIRA se ukrývá linková rezonanční analýza. Tento unikátní a komplexní systém je schopný v reálném čase u položených kabelů či během pokládkových prací vyhledat a lokalizovat poruchy, a to bez ohledu na to, zda vznikly v důsledku použitého materiálu, mechanického namáhání nebo podmínek vnějšího prostředí (například působením vnikající vody, chemikálií, roztažnosti, vysoké teploty, vlhkosti či záření).

Jak LIRA pracuje

LIRA je systém s patentovaným soft-warem určeným k tomu, aby kalkuloval a analyzoval kabel skrze jeho spektrum vstupní impedance. Vše je založené na teorii přenosového vedení, prostřednictvím posouzení a analýzy komplexní impedance vedení jako funkce frekvence použitého signálu. Jednoduše řečeno – do měřeného kabelu je vyslán signál přesně daných parametrů. Následně se měří doba, než se vyslaný signál vrátí zpět do testovacího diagnostického přístroje. Každá porucha v kabelu na něm způsobuje anomálii a v tomto místě se vyslaný signál částečně odráží zpět k začátku kabelu a částečně prostupuje dál do kabelu. Všechny tyto informace se zobrazují na přenosném diagnostickém zařízení. Důležité je, že měření jsou současně zaznamenávána a mohou být následně analyzována mimo místo, kde se prováděla diagnostika. Výsledky se automaticky exportují a mohou být uloženy jako referenční záznamy. Systém LIRA je výraznou úsporou času a investičních i provozních nákladů. Pro detekci problémů není třeba kabel odkrývat nebo vykopávat. LIRA potřebuje pouze přístup k jednomu konci kabelu s připojením ke dvěma vodičům nebo k vodiči a plášti vodiče. Systém LIRA se dá použít pro všechny druhy kabelů až do délky několika set kilometrů, je vhodný pro vícevrstvé i vícežilové kabely. LIRA je schopna lokalizovat kritická místa s odchylkou menší než 0,3 % z délky kabelu. Aplikací systému nedochází k žádnému elektrickému namáhání izolace kabelu.

Jak postupovat, když LIRA objeví problém?

Když už se problém na kabelu podařilo najít bez jediného kopnutí do země nebo do stěny, chybu umíme napravit stejným způsobem. Zatímco u nadzemních elektrických vedení nepředstavuje jejich případná rekonstrukce či výměna vážnější problém, u podzemního vedení je situace mnohem komplikovanější. Pomocí podzemních kabelů je navíc elektrina rozváděna především ve městech, což ještě více komplikuje jejich už tak náročnou výměnu. Díky technologii, kterou vyvinula společnost Siemens ve spolupráci se svým partnerem – firmou Novinium, však lze životnost kabelů prodloužit až o několik desítek let bez výkopových prací a těžké techniky.

Celý proces renovace kabelů je založen na vyplnění vnitřku vedení speciální sili-konovou směsí. Ta je do kabelů vstříkována pod konstantním tlakem a postupně zaplňuje všechny prostory mezi vodiči, dokud není kabel naplněn až po druhý ko-nec. Směs poté v kabelu přibližně sedm dní proniká do původní izolace a navrácí jí její dřívější ochranné vlastnosti. Tato fáze však může být realizována i pod napětím, takže vedení může být zprovozněno prakticky ihned po naplnění kabelu, což trvá řádově pouze jednotky hodin.

Efektivita i variabilita

Kromě nesporných výhod celé metody, zejména co se týče časové a finanční náročnosti, je potěšitelný i její ekologický aspekt. Původní kabely při ní není třeba nahrazovat novými, a mohou tak sloužit další desítky let. Samotná směs, která se pro plnění kabelů využívá, je i přes svoje vlastnosti šetrná k životnímu prostředí – není hořlavá, toxická ani karcinogenní. Její složení lze navíc upravovat podle teplotních a dalších vnějších podmínek, v nichž se kabel nachází. Každé vedení tedy může být ošetřeno doslova „na míru“.

Kontejner pro TPCA

Rozvodna Ovčáry 110/22 kV nedaleko Kolína prochází kompletní rekonstrukcí. Protože ale zásobuje energií nespočet subjektů, kromě jiného například automobilku TPCA, nesmí v průběhu oprav dojít k žádným výpadkům. Část 22 kV byla z těchto důvodů dočasně nahrazena mobilní kontejnerovou rozvodnou.

Nezávislá mobilní kontejnerová rozvodna vysokého napětí vznikla pro potřeby ČEZ Distribuce, a.s., a je využitelná především v rámci rekonstrukcí, případně havárií stávajících rozvodů a spínacích stanic VN obecně.

Na dálku i místně

Řízení a chránění rozvodny dodala společnost Siemens. Systém umožňuje plnohodnotné dálkové a místní ovládání všech spínacích prvků, tedy vypínačů, odpojovačů, odpínačů a uzemňovačů. Ovládání z místa se provádí z ovládacích terminálů jednotlivých polí rozvaděče VN. To zajišťuje plný komfort ovládání, tedy ochranu proti chybné manipulaci v rámci celé rozvodny (tzv. „velké blokády“), záznam všech manipulací a souvisejících událostí do deníku ochrany i do dispečerského řídicího systému apod. Silové prvky je možné samozřejmě ovládat i nouzově – tlačítky, případně pákovým mechanismem přímo na rozvaděči.

Hlava řídicího systému

Mozkem řídicího systému je jednotka SICAM AK 1703 ACP vybavená komunikačními kartami pro hlavní a záložní komunikaci na nadřazený řídicí systém a dále pro komunikaci s terminály chránění SIPROTEC protokolem podle IEC61850 v topologii dvojitého optického kruhu. Touto komunikací je zároveň realizován dálkový dohled a servisní přístup do ochrany z centrální

inženýrské stanice. Řídicí systém dále zahrnuje komunikační prvky (switche, routery), server časové synchronizace, terminál pro sběr společných poruch a přepínač záložního napájení.

System chránění

Vývodové terminály SIPROTEC jsou instalovány v NN nástavbách jednotlivých polí rozvaděče VN. Procesní signály z rozvaděče jsou zpracovávány příslušným terminálem pole, veškeré informace mezi jednotlivými vývody se přenášejí výhradně komunikací po optickém vlákně. Terminály vývodových polí jsou vybaveny mimo jiné funkcí opětného zapnutí, zvláštního režimu provozu pro práci pod napětím, automatikou frekvenčního odlehčování atd. Základní zprovoznění včetně parametrizace ochran, dle typových liniových schémat a standardizovaných seznamů informací, povelů a měření, proběhla ve spolupráci zástupců firem ČEZ Distribuce, a.s., Siemens, s.r.o., a Schneider Electric CZ, s.r.o.

AFDU

Pod zkratkou AFDU se skrývá anglické Arc Fault Detection Unit, tedy přístroj pro detekci elektrického oblouku. Jde o relativně nový typ ochranného přístroje, který umí vyhodnotit vznik sériového nebo paralelního oblouku v koncových obvodech do hodnoty jmenovitého proudu 16 A. Jeho hlavním úkolem je účinně zabránit vzniku požárů, ke kterým by mohlo dojít vinou poškozených elektrických přístrojů nebo instalací.

Nižší počet požárů zapříčiněných elektrickou energií

Je pravda, že jsme před tímto nebezpečím chráněni hned několikanásobně – běžně používáme pojistky, jističe a proudové chrániče. Proč tedy ještě AFDU?

Elektrický oblouk, zkrat, je jednou z nejnebezpečnějších poruch v elektrických sítích. Může způsobit přímé ohrožení obsluhy, poškození zařízení a výpadky dodávky elektrické energie. Dojde-li při této poruše k vývinu proudu o vysoké hodnotě, umí jej správně navržené přístroje dostatečně rychle a bezpečně odpojit. Zde si plně vystačíme se současnými konstrukcemi jističů a pojistek. V některých případech poruch doprovázených elektrickým obloukem se ale vyvine proud o řádově nižších hodnotách. Tyto poruchy jsme zatím neuměli detekovat a jejich rychlé zjištění záviselo jen na všímavosti obsluhy zařízení. Díky tomu se tato porucha v lepším případě časem změnila ve zkrat s vysokou hodnotou proudu a byla vypnuta. V horších případech se pak mohla stát příčinou požáru.

Specifické vlastnosti poruch

Jak už bylo řečeno, některé poruchy sériového či paralelního oblouku současné ochranné přístroje (nebo jejich kombinace) nedokáží včas detekovat a odpojit. Z některých fyzikálně-matematických rozborů těchto složitých jevů vyplynulo, že každý provozní či poruchový stav, který doprovází jiskření či vývin oblouku, je charakterizován specifickým rozsahem vysokofrekvenčních kmitů, průběhů napětí a proudů. Od tohoto zjištění pak byl jen krůček k návrhu přístroje, který dokáže rozlišit průběhy provozních proudů včetně harmonických složek, rušení atd. od průběhů poruchových proudů při vývinu paralelního nebo sériového oblouku

Nová technika snižuje riziko

Platná legislativa a příslušné technické normy definují maximální přípustnou úroveň rizika a z té vychází současná koncepce řešení ochrany. Jde o zažitá standardní pravidla. Ale v případech, kdy je ohrožen život či zdraví většího počtu osob nebo velké materiální hodnoty, bychom se měli snažit snížit úroveň rizika ještě výrazněji. Z historie známe tragické následky požárů v nemocnicích a hotelích, velké kulturní ztráty při požárech archivů a muzeí. Takovým situacím bychom se měli snažit zabránit, zejména když máme k dispozici příslušné technické prostředky. Zkušenosti z USA a Kanady, kde se přístroje reagující na poruchy vyvolané sériovým nebo paralelním obloukem používají už léta, ukazují, že je to možné.

Firma Siemens nabízí tento přístroj jako první v provedení pro evropský trh pod označením 5SM6.