1. Introduction

Technical texts as a form of technical and scientific communication nowadays are not only a communication tool of experts but they also affect communication of ordinary language users. Technical documentation, chemical composition of products, safety precautions for handling mechanisms and devices, working procedures, manuals, product parameters etc. best exemplify technical language used in technical texts.

The use of technologies in our everyday life brings about the fact that technical terminology and ordinary language overlap. This interaction concerns e.g. internet or mobile communication terminology, household or workplace equipment terminology, etc.

Requirements laid on various types of technical texts can be classified according to different points of view:

- from the point of view of a consumer; clarity, pertinence, comprehensiveness, informativeness and legibility is assumed, and
- from the point of view of a producer whose market-oriented criteria involve brevity and attraction.

Technical texts aimed at experts and specialists are less comprehensible to ordinary users and their most typical characteristics are professional expertise, terminology, more complex sentence structure.

Communication in the professional area is successful only on condition that all the individuals involved in the communication have mastered the inventory of technical terminology and have sufficient command of communication strategies of verbal and non-verbal nature.

Pekarovicova [1] lists the following prerequisites essential for communication in the technical area:

- “building of fundamental lexical and grammatical apparatus inevitable for verbal and non-verbal behaviour in specific communication situations denominated as technical and communication minimum (composed of inventory of frequent general expressions of categorial meaning),
- understanding of transformational and derivational possibilities of the Slovak language, adopting respective sentence structures and specific terminology relevant to the field of study.”

Pekarovicova recommends creating information and communication base of technical texts by means of “technical communication models comprising word-formation, denomination and syntactical utterances for determination, description or classification of objects and phenomena or demonstrating relations in technical texts” [1, pp. 3–10].

A number of linguists have aimed their research at structural modelling of technical language:

A Slovak linguist Findra in his publication Stylistics deals with the analysis of scientific prose style along with the characteristics of “formal model structures” [2, p. 181].

Becker, the author of Fachdeutsch Technik, Metall-und Elektroberufe coursebooks series, refers to structural models typical of technical language as “logic structures”. For the teaching process he suggests acquiring “structures” of definition, causality, working procedure etc. Technical phenomena and problems can be described, understood and solved provided we are capable of their linguistic reflection or understanding in logic structures [3, p. 6].

The issue of controlled language (kontrollierte Sprache) has captured interest of plenty of linguists engaged in linguistic research of technical texts and their typical structures. This version of the language is based on the specific textual models. Texts of this kind are simple in style, grammar and sentence structure and their vocab-
Pragmatic aspect of a language utterance arises from the function of the language being an active communication tool, i.e. language utterances are used effectively in order to arouse interest of parties involved in the communication. It is thus a relation between an utterance and its user, or its meaning and effect. Assuming the language utterances used for exchanging information had no practical benefit, they would be meaningless.

Pragmatic analysis comprises both syntactic and semantic element. Pragmatics focuses on clarity and efficacy of linguistic and non-linguistic utterances with particular respect to methods and forms of conscious selection of these utterances in order to achieve certain communication purpose.

A technical text is understood, produced, translated or interpreted well only on condition that the communicators employ their technical and communicative competences. This means that they match their professional knowledge of the subject matter of the communication with their language mastery (terminology and typical linguistic structures) as well as with their interpretational skills. Concord of content, form and function is hence achieved.

Summing up the knowledge of morphology, lexicology and syntax and relating it to its function, we come to an assumption that typical characteristics of a technical text are such language utterances whose most significant features are exactness and definiteness. Frequent occurrence of nouns is another typical attribute of technical texts. It is closely linked with notional-terminological denominations (in German mostly in the form of compounds) and with the propensity for syntactic condensation.

As Findra points out, a technical text is typical of its “nominal character” being the grounds of its “abstractness and notional brevity” [2].

Definiteness and accuracy are enhanced by the occurrence of language utterances performing various functions, e.g. modifiers of nouns – genitive (height of girder, intersection of axes, etc.), present participle (drilling torque), or past participle (welded material).

Another specific attribute of a technical text is its objectivity and neutrality. Passive constructions are typical of English and German technical texts. Descriptive function, commonly expressed by relative clauses, is also an exemplary feature of technical texts.

Selection of language utterances is closely linked with the function of the text. As far as functional aspect is concerned, technical or scientific texts can define, classify, describe objects or actions, provide instructions, compare, review, assess or explain.

The most remarkable feature of a technical text is the lexical predominance of terminology. Emphasis of the lexical aspect of the technical language brought about detailed study of terminology (Hoffmann Kommunikationsmittel Fachsprache) [5]. This resulted in focusing the primary interest on the analysis of word-formation. Technical terms endow technical texts characteristic features of conceptuality, neutrality, definiteness and accuracy. Word-forma-
tion process also abides by certain structural models by means of which the following specific communication functions can be achieved:
- nominal, in order to denominate actions, mediators of actions, or properties of technical objects or quantities,
- descriptive, to describe properties of technical objects and phenomena etc.

The aim of this research was to gather frequently used model linguistic structures in Slovak, English and German technical texts whose common feature was pragmatic function. Based on this fact, they interacted systemic and structural characteristics of technical texts with their function and impact on the addressee. By means of comparison of these model linguistic structures in several languages, valuable findings about technical texts as linguistic-pragmatic elements have been obtained.

Linguistic and pragmatic analysis of technical texts concentrated on the presence of word-formative, grammatical, syntactical structural models and their functions designated in this paper as nominal, descriptive and directive functions. The aforementioned functions attributed to the models certain word-formation processes.

2. Examples of certain types of structural models

Morphological structural models in technical texts

Morphology of the technical language distinguishes the process of constituting forms (Formbildung), namely formal representation of certain grammatical categories and word formation (Wortbildung) [7, p. 16].

1.1. Word-formation structural models

- with nominal function (resulting product is a noun)
  a. denomination of activities or mediators (verbal nouns, nomina agentis, nomina instrumentalis)
  b. denomination of properties of technical objects or quantities/parameters

<table>
<thead>
<tr>
<th>Infinitive German/English</th>
<th>Slovak</th>
<th>German</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>zvarat schweißen/ weld</td>
<td>zvaranie</td>
<td>das Schweißen</td>
<td>welding</td>
</tr>
<tr>
<td>zvar</td>
<td>zvar die Schweiße</td>
<td>weld</td>
<td></td>
</tr>
<tr>
<td>zvarac</td>
<td>der Schweißer</td>
<td>welder</td>
<td></td>
</tr>
<tr>
<td>zvaracka</td>
<td>die Schweißmaschine</td>
<td>welder</td>
<td></td>
</tr>
<tr>
<td>dlhy/ lang/ long</td>
<td>dlzka</td>
<td>die Länge</td>
<td>length</td>
</tr>
<tr>
<td>siroky/ breit/ wide</td>
<td>sirka</td>
<td>die Breite</td>
<td>width</td>
</tr>
<tr>
<td>vysoky/ hoch/ high</td>
<td>vyska</td>
<td>die Höhe</td>
<td>height</td>
</tr>
<tr>
<td>hlboky/ tief/ deep</td>
<td>hlba</td>
<td>die Tiefe</td>
<td>Depth</td>
</tr>
<tr>
<td>pevny/ mest/ strong</td>
<td>pevnost</td>
<td>die Festigkeit</td>
<td>strength</td>
</tr>
</tbody>
</table>

1.2. Grammatical structural models

- with attributive function of nouns, the purpose of the language utterance is to provide more specific and accurate characteristics [7, p. 21].

<table>
<thead>
<tr>
<th>Gram. form</th>
<th>Slovak</th>
<th>German</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genitive</td>
<td>rychlost lietadla</td>
<td>Geschwindigkeit des Flugzeuges</td>
<td>velocity of aircraft</td>
</tr>
<tr>
<td>Present participle</td>
<td>pohybujuci sa prvak</td>
<td>hin- und hergehendes Element</td>
<td>moving part</td>
</tr>
</tbody>
</table>

2. Syntactic structural models

These generally include sentence structures

- with imperative function

<table>
<thead>
<tr>
<th>Function</th>
<th>Slovak</th>
<th>German</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necessity/obligation:</td>
<td>znecesteny filter treba (ma sa) vycistit.</td>
<td>Das schmutzige Filter ist sofort zu reinigen.</td>
<td>A dirty filter needs cleaning.</td>
</tr>
<tr>
<td>Possibility:</td>
<td>znecesteny filter sa da lahko vycistit.</td>
<td>Das schmutzige Filter ist leicht zu reinigen.</td>
<td>A dirty filter is easy to clean.</td>
</tr>
<tr>
<td>Prohibition:</td>
<td>znecesteny filter sa nesmie pouzivať.</td>
<td>Das schmutzige Filter ist nicht zu benutzen.</td>
<td>A dirty filter must not be used.</td>
</tr>
</tbody>
</table>

- with comparative function

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Slovak</th>
<th>German</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>properties</td>
<td>X je vacsie ako Y</td>
<td>X ist großer als Y</td>
<td>X is greater than Y</td>
</tr>
<tr>
<td></td>
<td>Y je mensie ako X</td>
<td>Y ist kleiner als X</td>
<td>Y is smaller than X.</td>
</tr>
</tbody>
</table>
Technical texts not only vary in subject matter based on a particular professional area (mechanical engineering, power engineering, telecommunications, information technologies, civil engineering etc.) but also in the level of professional expertise which affects terminology density as well as sentence structure. The degree of professional expertise of a technical text is dependent on the target reader. Instructional technical texts designed for consumers of technical products ought to be simple, comprehensible and clear, supplemented by non-verbal textual elements like images, photographs, diagrams, tables, charts, etc. Latest information technologies enable us to use sound simulations, animated pictures, videos, etc. Safety cautions are guiding, bare, brief, urgent and comprehensible texts generally reinforced by warning signs (Inflammable! Poison! High voltage danger).

Technical texts designed for specialists or experts are more elaborated, saturated with technical terms, and have more complex sentence structure, which makes them less comprehensible to ordinary consumers/readers. Hoffmann [5, p. 33] made a division of technical texts according to the level of abstraction into scientific texts ranging from theoretical, experimental and applied science, professional texts designed for specialists or experts which are usually find technical language unfamiliar and incomprehensible. This applies to various types of texts, e.g. user manuals, composition of chemical substances, safety warnings etc. Therefore, technical information often includes images, photographs, diagrams etc. in order to reinforce perception of the technical text. Complex sentence structures and high terminology standard may be viewed as a barrier for a smooth communication. Understanding the structures of the technical language in relation to the function of the text leads to refining language competences and perceiving the technical text correctly.

Structural models may become useful tools for
- making the process of technical language teaching at universities more efficient in order to acquire more profound knowledge in the professional area
- improving skills of technical texts comprehension
- translating technical texts,
- production of technical texts in foreign languages.

Short technical texts such as instruction manuals or safety cautions accompany products on the market and in compliance with the regulations of the European Union they must be translated into several languages. Numerous international corporations and producers that sell and provide their products and services in Slovakia are also obliged to elaborate manuals or working instructions in foreign languages. Active knowledge of a foreign technical language is therefore a necessity. Many companies require sufficient proficiency of a technical language apart from their internal "controlled languages". "At present a growing number of international companies has brought about the demand for language learning. Sufficient command of a foreign language has become a prerequisite for a success on the labour market" [8, p. 242]. Structural models can enhance the process of mastering linguistic and technical competences in a foreign language for ordinary users as well as in a professional field.

The incursion of technical language into everyday life is often felt by ordinary users as a communication hindrance as they usually find technical language unfamiliar and incomprehensible. This applies to various types of texts, e.g. user manuals, composition of chemical substances, safety warnings etc. Therefore, technical information often includes images, photographs, diagrams etc. in order to reinforce perception of the technical text. Complex sentence structures and high terminology standard may be viewed as a barrier for a smooth communication. Understanding the structures of the technical language in relation to the function of the text leads to refining language competences and perceiving the technical text correctly.

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