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PHRASAL VERBS IN MECHANICAL ENGINEERING DISCOURSE: A CASE STUDY

Countless research studies have been carried out covering wide range of aspects associated with phrasal verbs. However, little has been done when it comes to phrasal verbs in the mechanical engineering discourse, more so in the ESP teaching in the B/C/S context. This paper was aimed at investigating the role of phrasal verbs in the technical discourse, identifying the most frequent phrasal verbs within mechanical engineering register and determining the level of familiarity with such structures among the students at the Faculty of Mechanical Engineering in Zenica.

Key words: ESP teaching; engineering discourse; phrasal verbs: one-word equivalent; phrasal verb avoidance tendency

1. INTRODUCTION

It is a well-known fact that over the past several decades the English language has become the lingua franca – language used for everyday communication, not only in the Anglo-Saxon world but also around the globe (Crystal 2012). At the same time, the innovations of the modern age have led to a plethora of developments in science and technology, communication, and many other aspects of life, most of them resulting in an increased necessity of dealing with English which is used for specific and professional purposes (ESP). Consequently, more and more universities opted for introducing some of the content-based language approaches in their curricula. The state of affairs at universities in Bosnia and Herzegovina mostly allows for ESP

courses of obligatory and elective type although some of them, such as University of Zenica, have recently introduced activities related to some other approaches such as CLIL (Content and Language Integrated Learning).

ESP, the most present approach, has always been allotted a small number of classes. Hence, there has always been an effort to economise, that is, to identify the language phenomena that need to be insisted upon. One of them refers to phrasal verbs. As language structures, phrasal verbs have long been a part of ELT curricula and have always found their place in the foreign language textbooks. However, the use of phrasal verbs is quite specific and, as such, a topic of many discussions over the necessity of their introduction into the foreign language syllabi. Namely, some authors (Bolinger 1971; Celce-Murcia and Larsen-Freeman 1983; Cornell 1985; Meyer 1975; etc.) claim that phrasal verbs have a dimension of informality considering them characteristic of informal (out-of-school) rather than formal (in-school) communication. On the other hand, Pye (1996: 699) argues that “it is misleading to emphasise this [informality] as one of their most distinctive features... In fact, a phrasal verb is very often the normal or neutral way of expressing something.” While discussing the relevance of these structures some authors maintain that fluency in English is directly dependent on the frequency in use of formulaic structures as phrasal verbs. That is, the higher the proficiency and fluency, the more frequent are the phrasal verbs and collocations with idiomatic meaning (Bjelajac 2017).

Nonetheless, the vast number of the studies related to the relevance of phrasal verbs refers to the phrasal verbs in general English, giving less attention to phrasal verbs across different registers. The present paper focuses on the use of phrasal verbs in technical discourse, more precisely, in mechanical engineering register. Namely, a research was carried out at the Faculty of Mechanical Engineering in Zenica, aimed at investigating the role and significance of phrasal verbs in the aforementioned register by identifying their frequency across different genres (instruction manuals, scientific papers, textbooks) as well as by determining the level of their usage among mechanical engineering students. The results were intended to help upgrading the ESP curriculum at this Faculty. The research which was done against the relevant theoretical background included several phases from corpus creation to data analysis.

2. LITERATURE REVIEW

The importance of prepositions and prepositional verbs dates back to the times when English language saw drastic changes, one of them being the drop of the grammatical

case. In those processes, prepositions have assumed a new role of carrying a certain semantic weight, which helped in construction of new lexical items – phrasal verbs. These verbs were produced and used almost extensively even in the Shakespearean time (Blake 2002). As a result, phrasal verbs were propelled into prominence and have long been regarded as one of the most characteristic features of the English language.

Structurally, a phrasal verb is a formation that consists of two components, a verb and a particle. They are orthographically considered as two separate words. However, semantically, the verb and the particle are fused together. The particle is almost always homonymous with an adverb or a preposition that carries a number of semantic, syntactic and prosodic characteristics (Thim 2012). It can be said that native speakers are very much aware that “the system underlying phrasal verbs is semantically complex and that combinations display very different levels of idiomaticity... However, using their unconscious knowledge native speakers have no problem in decoding them [phrasal verbs]” (Armstrong 2004: 215). On the other hand, these verbs are considered as one of the most notoriously challenging issues to non-native speakers due to the broad spectrum of syntactic and semantic varieties in which they occur (Gardner & Davies 2007). At the same time, piecemeal approaches to teaching and learning phrasal verbs make the processes even more daunting, resulting in poor abilities of students to use them (Strong 2013). Further problems arise due to the neglecting of cognitive approaches and their presumptions in teaching these verbs. Namely, cognitive linguistics recognises the meaning of a phrasal verb as a result of dynamic processes between lexis and grammar (Thom 2017). Consequently, such processes created a wide spectrum of meanings which phrasal verbs assume. According to Becker (2004: 3) „one reason for the difficulty in mastering the use of phrasal verbs can be explained by the fact that phrasal verbs can belong to different semantic categories, which are not always apparent to L2 learners”. In that sense, Riguel (2014) states that the meanings of phrasal verbs may range from spatial to directional, literal or transparent to aspectual, completive to non-compositional, opaque or idiomatic. Phrasal verbs with idiomatic meanings may well be the most complex ones for learners of English because of the mismatch between the idiomatic meaning and the meanings of the individual words that make up the phrasal verb.

According to some authors (Bolinger 1971; Darwin & Gray 1999; Kovitz 2003), the productivity and frequency of phrasal verbs in English comes from their flexibility feature. Thus, Bolinger’s seminal study (1971: xiii) defines phrasal verbs as being „the most prolific source” of new words in English. A change of an element in the

phrasal verb construction brings about completely different meaning allowing for easy creation of a completely new lexical item (Kovitz 2003).

According to a study carried out by Li et al. (2003), phrasal verbs form about one third of verb vocabulary in English, which confirms that they are a frequent part of the English language and as such are of a great importance to the learners of English (Pye 1996), including the ESP ones. In that respect, Brady (1991: 2) confirms the significant role of phrasal verbs in the technical discourse while maintaining that "... phrasal verbs are in some way integral to technical context... they are legitimate objects of ESP study, for in technical contexts they are often more precise than their single word synonyms".

Notwithstanding the productivity, frequency, and flexibility of phrasal verbs, there is a substantial number of studies (Dagut & Laufer 1985; Hulstijn & Marchena 1989; Laufer & Eliasson 1993; Irujo 1993; Liao & Fukuya 2004; Becker 2014; Yildiz 2016; Haute 2017) proving that EFL students seem to resort more readily to one-word verbs thus avoiding phrasal verbs. Reasons can be related to distinctive semantic and syntactic challenges related to phrasal verbs. The first research into the learners' avoidance of phrasal verbs was carried out by Schachter (1974) who determined the avoidance as a linguistic phenomenon in the realm of second language acquisition. Each of the aforementioned studies proposes different reasons, one of them noting that "avoidance is the reverse side of negative transfer, since learners tend to avoid using in L2 those structures that have no parallel in their L1 and therefore provide them with no pattern to transfer" (Dagut & Laufer 1985: 73). In other words, 'avoidance' implies that the learner is familiar with a certain structure but is not confident enough to freely use it. As Laufer & Eliasson (1993) put it, avoidance is actually one of the strategies that learners turn to when they want to overcome a communicative difficulty because "if a student finds a particular construction in the target language difficult to comprehend, it is very likely that he will try to avoid producing it" (Schachter 1974: 213). On the other hand, a long-term experience of one of the authors of this paper gained at the Faculty of Mechanical Engineering in Zenica has shown that many students make use of phrasal verb patterns that they are familiar with to make *ad hoc* solutions in communication.

Considering the complexities related to phrasal verbs as well as the fact that the students seem to be prone to incorrectly use phrasal verb patterns, it seemed necessary to carry out a research. In the light of the previously mentioned economisation in an ESP classroom, the research was aimed to identify the level of phrasal verb significance in the said context by determining their frequency within the mechanical engineering register and by testing the students knowledge on phrasal verbs against

the backdrop of the currently used textbook. Finally, the prime purpose of the research was to indicate whether the focus in the ESP course at the Faculty of Mechanical Engineering in Zenica should be intensified with respect to the phrasal verbs.

3. METHODOLOGY

3.1. Research Questions

The research was carried out at the Faculty of Mechanical Engineering in Zenica at the end of the 2020/2021 academic year. It was guided by the following research questions (RQ):

RQ1 How significant is the role of phrasal verbs in the mechanical engineering register?

RQ2 Do the phrasal verbs covered by the current ESP syllabus at the Faculty of Mechanical Engineering meet the requirements of the profession?

RQ3 Should the focus on teaching phrasal verbs be intensified following the results on their avoidance among the students?

3.2. Research participants

The participants were students enrolled in the third and fourth year of study. The third year students (74 in total) made a junior student group that, at the time of the research, had already received a year long instruction in Technical English. On the other hand, the fourth year students (23 in total) made the senior student group. These students received two year long instruction in Technical English.

3.3. Instruments and procedures

The research was conducted in three phases. *The first phase* was the corpus creation phase. The *second phase* was reserved for data collection and the analysis of the data was done in the *third phase*.

Since there was no ready-made corpus that could have met the requirements of the research, a specialised corpus was created on the basis of texts collected from relevant scientific journals, instruction manuals, and from the ESP textbook which is currently in use at the Faculty of Mechanical Engineering in Zenica. Texts were chosen to cover the fields related to mechanical engineering, such as mechanical design, environmental engineering, production engineering, and maintenance. The instrument

used in the *first phase* was a resource tool called WordSift designed by the Stanford doctoral students, science teachers and SERP (Strategic Education Research Partnership)¹. All phrasal verbs found in the corpus were sifted in terms of the most frequent occurrence and a list of the 20 most frequent phrasal verbs was established.

In the *second phase*, the data were collected concerning both the familiarity of the students with the previously provided most frequent phrasal verbs and their readiness to use them. For this purpose, two separate Google Forms questionnaires were designed and distributed to the participants. In order to eliminate any frustration that students as participants of this type of study might develop as well as to create a comfortable atmosphere, students were informed that the questionnaire would not be graded, that the content of questionnaire was directly related to the contents familiar to them, and that the aim of the research was the improvement of the ESP classes at the Faculty. Having in mind that they are making contribution to the language classes for the future generations, students were motivated to participate.

The *third phase* of the research was dedicated to a quantitative analysis of the data collected in the previous phase. The results of the analysis were double-checked by a statistical program PSPP².

4. RESULTS AND DISCUSSION

In the *first phase* of the research and upon the consultations with mechanical engineers working as professors at the University of Zenica, a number of texts from different technical genres were selected. The selection included approximately 100,000 words which served as a corpus for the research (Table 4.1). The scientific articles covered 62 037 words. Out of that number 388 verbs (0.63%) were phrasal verbs. The instruction manuals covered 30 466 words. Among them, 394 phrasal verbs (1.29%) were detected, showing a much bigger presence of phrasal verbs in this genre than in scientific journals (almost twice as much). In the corpus of 15 000 words of the ESP textbook, 171 phrasal verbs were found (1.14%). The analysis proved that the smallest occurrence of the phrasal verbs was in scientific journals (0.63%) whereas the occurrence of these verbs in manuals and a textbook was somewhat higher (1.29% and 1.14%, respectively).

¹ Available on <https://wordsift.org>

² PSPP is a free-of charge alternative to SPSS.

Table 4.1 Corpus analysis with respect to the occurrence of phrasal verbs

Corpus materials	No. of words	Total no. of phrasal verbs	Percentage (%)
scientific journals	62037	388	0.63
instruction manuals	30466	394	1.29
ESP textbook	15000	171	1.14

Once the presence of phrasal verbs in technical texts was determined, the whole lot of the identified phrasal verbs was sifted by the *WordSift* tool. The aim was to isolate the most frequent ones within the totality of the corpus. The sifted verbs (20 in total) were subsequently searched for within the texts of each genre. Table 4.2 shows these verbs in order of their frequency within the corpus as well as their distribution across the genres.

Phrasal verbs	ESP textbook	Journals	Manuals
switch off			✓
agree with		✓	✓
put on			✓
refer to	✓	✓	✓
put into			✓
depend upon/on	✓	✓	✓
shut down		✓	✓
lead to	✓	✓	✓
come from		✓	
carry out		✓	✓
convert into	✓		
result in	✓	✓	✓
account for		✓	
bring about	✓	✓	
pull out			✓
turn on			✓
switch on		✓	✓
focus on		✓	
screw on			✓
derive from	✓	✓	

Table 4.2 The list of the 20 most frequent phrasal verbs and their distribution across the genres

Out of the 20 most frequent verbs, 14 verbs (70%) occur in instruction manuals, 13 (65%) in scientific journals and 7 verbs (35%) in the ESP textbook. A very high occurrence of the phrasal verbs in the texts related to manuals and journals proves

their significance within the mechanical technical discourse. At the same time, the overlaps in the distribution of phrasal verbs across the genres identified the phrasal verbs which occurred in majority of the texts, making thus their common denominator. They are: *refer to*, *depend upon/on*, *lead to* and *result in*. Consequently, these phrasal verbs should be regarded as an inevitable part of any ESP syllabus related to mechanical engineering. It should be noted that almost all phrasal verbs isolated from the textbook were found in the texts from other two genres. In other words, the selection of phrasal verbs that are currently being taught at the Faculty of Mechanical Engineering is justified. However, there are the verbs in the list, such as *agree with*, *shut down*, *carry out* and *switch on*, that were not found in the textbook but their occurrence overlapped in the scientific journals and manuals. These verbs should definitely be treated as a priority in mechanical engineering ESP classes, and along with the other ones from the list, included in the syllabi.

In the next, *second phase* of the research two separate questionnaires were designed, one for junior student group and another for seniors. As already noted, they were aimed at determining the level of students' familiarity with 20 most frequent phrasal verbs and their readiness to use them. Each item in both questionnaires was an incomplete sentence to be filled with multiple choice answers. The choice always included a correct phrasal verb, a semantically corresponding one-word verb and two other incorrect verbs serving as distracters. The rationale behind offering a phrasal verb as well as its one-word equivalent was to identify the more preferable form for the students and thus determine the level of phrasal verb avoidance.

In the *third phase* of the research the analysis of the results was done. The results are shown in the Table 4.3.

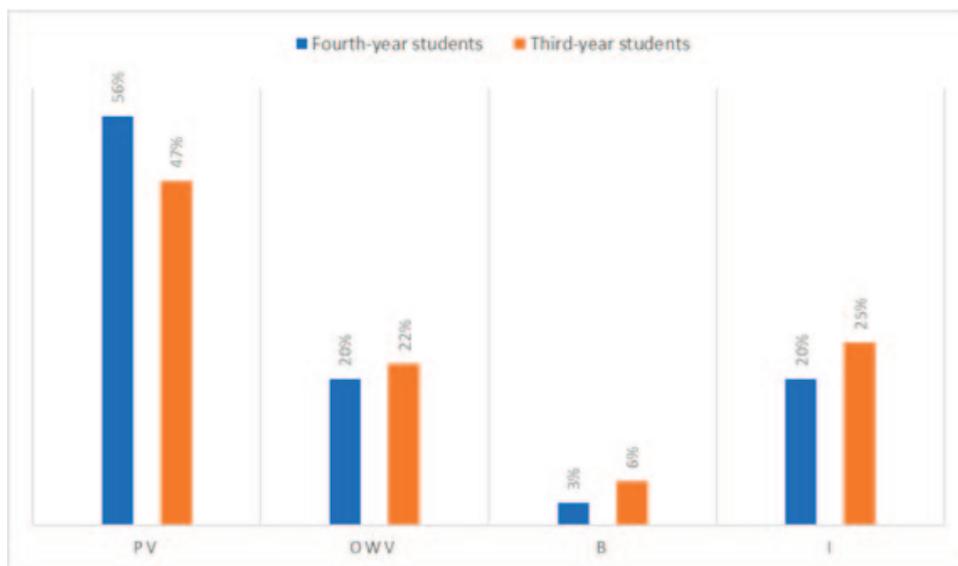
Table 4.3 The list of the 20 most frequent phrasal verbs and their distribution across the genres

Phrasal verbs	Senior students				Junior students			
	<i>PV</i>	<i>OWV</i>	<i>B</i>	<i>I</i>	<i>PV</i>	<i>OWV</i>	<i>B</i>	<i>I</i>
switch off	65%	9%	0%	26%	46%	35%	9%	11%
agree with	22%	22%	4%	48%	26%	19%	4%	51%
put on	43%	0%	0%	57%	45%	1%	4%	47%
refer to	87%	4%	4%	4%	36%	65%	8%	1%
put into	91%	4%	0%	4%	39%	0%	3%	58%
depend upon	87%	9%	0%	4%	68%	0%	0%	32%
shut down	96%	4%	0%	0%	55%	14%	8%	23%
lead to	74%	9%	9%	4%	62%	27%	0%	11%
come from	74%	4%	0%	17%	27%	11%	1%	59%
carry out	17%	48%	4%	26%	14%	58%	20%	7%
convert into	87%	9%	4%	0%	92%	0%	5%	1%
result in	30%	43%	13%	13%	39%	32%	7%	31%
account for	26%	30%	0%	43%	30%	47%	1%	22%
bring about	17%	78%	0%	4%	23%	54%	1%	22%
pull out	43%	48%	4%	4%	28%	38%	23%	11%
turn on	52%	26%	13%	9%	93%	1%	4%	1%
switch on	61%	22%	9%	9%	68%	20%	12%	0%
focus on	83%	4%	0%	13%	93%	3%	1%	3%
screw on	9%	0%	0%	91%	9%	0%	0%	91%
derive from	78%	4%	0%	17%	59%	1%	1%	38%
Average	56%	20%	3%	20%	47%	22%	6%	25%

Four columns in each group (juniors and seniors) present four different types of students' answers. Thus, the *PV* column relates to the percentage of answers in which students used correct phrasal verbs, the *OWV* column – to the answers in which students opted for one-word verbs, the column *B* shows the percentage of students who used both the phrasal verbs and one-word verbs, whereas the column *I* refers to the students who provided incorrect verbs (distracters) as their answers.

The data analysis has shown that both groups provided a significant number of correct answers when phrasal verbs are concerned. Around half of the students from each group have opted for a correct phrasal verb. In that respect, seniors reached 56% and juniors 47% of correct answers. Obviously, seniors outperformed juniors by 6% (Fig. 4.1).

Fig. 4.1 Questionnaire results



The lack of familiarity with phrasal verbs or even the reluctance in using them as a sign of a possible avoidance tendency is obvious from the data showing the number of students who provided answers with only one-word verbs. In that sense, the results were rather unified in both groups. More precisely, the students from the senior group were the ones who used one-word equivalents less (20%) than the students from the junior group (22%). Similarly, unified results in both groups were found in terms of incorrect answers. Again, senior students made less mistakes (20%) than the junior ones (25%). The least percent of correct answers in both groups (3% in the senior group and 6% in the junior group) belonged to the students who chose both phrasal verbs and their one-word equivalents. Those are the students who may well be insecure in the best solution. Seniors, with the longer received instruction in Technical English seemed to be more confident (only 3% of the students gave such answers) than the students from a junior group (6%). Yet, all the students who opted for such answers added to a total number of students familiar with phrasal words (PV + B) showing that 59% of students in the senior group and 53% of them in the junior group are using phrasal verbs correctly with a varying level of confidence.

Although significant in terms of students' familiarity with phrasal verbs, the results were not completely satisfactory. Namely, there was still a solid cohort of students in each group who showed that they were not familiar with phrasal verbs, be it because

they used only one-word verbs or because they provided incorrect answers (OWV + I). Compared to the number of such students in the junior group (47%), the students in the senior group showed better results (40%). This is most probably owing to the longer instruction in ESP that these students have received. Nevertheless, it is pretty alarming to realize that the students from both groups have rather poor knowledge on some quite ordinary phrasal verbs typical of this type of discourse, such as *screw on*, *bring about* and *carry out* (Table 4.3).

Finally, all results were additionally double-checked by using the t-test in PSPP (Table 4.4).

Table 4.4 The list of the 20 most frequent phrasal verbs and their distribution across the genres

	Mean	Std. Deviation	S. E. Mean
PV 4 – PV 3	0.90	2.32	0.52
OWV 4 – OWV 3	-0.25	1.80	0.40
B 4 – B 3	-0.35	0.63	0.14
I 4 – I 3	-0.65	2.05	0.46

As the reason behind the research was a possible upgrading of the ESP curriculum at the Faculty of Mechanical Engineering in Zenica, the answers to the research questions posed at the very beginning of the research offered certain solutions. Namely, the answer to the first question (*How significant is the role of phrasal verbs in the mechanical engineering register?*) is that the research has proven the significance of these verbs, particularly in terms of preparing young engineers to use instruction manuals where these verbs seem to be most present. Although their occurrence in the totality of the corpus (around 100 000 *words*) seems to be average varying from 0.63% (630) phrasal verbs in scientific journals to 1.29% (1290) ones in instruction manuals their share in the total number of *verbs* in the corpus related to mechanical engineering would show much higher results. Another research in that direction would definitely provide more information and good grounds for a comparison with the study carried out by Li et al. (2003) claiming that phrasal verbs form about one third of *verb vocabulary* in general English. In any case, phrasal verbs should have their place in the ESP curricula, particularly for their prolific nature in creating new meanings.

Finally, it was necessary to determine if *the phrasal verbs covered by the current ESP syllabus at the Faculty of Mechanical Engineering meet the requirements of the profession*, which, in fact, was the second research question. Almost all of the verbs

from the ESP textbook currently used at the Faculty which were found among the most frequent verbs in the corpus related to mechanical engineering were also found in the texts from another two genres (scientific journals and instruction manuals). The fact proves that they do meet requirements of the profession. However, they cover only one third of the most frequent verbs. This means that the current ESP curriculum at the Faculty of Mechanical Engineering should be intensified in terms of teaching phrasal verbs. The insufficient coverage of the ESP textbook in terms of the most prominent phrasal verbs relevant for mechanical engineering as well as the fact that a significant number of students still avoid using phrasal verbs at all (approx. 20 percent of students in each group) provides the affirmative answer to the last research question – *Should the focus on teaching phrasal verbs be intensified following the results on their avoidance among the students?* Not only should the focus be intensified in teaching the phrasal verbs which already exist in the textbook but it should be extended to the rest of the most frequent verbs found in the corpus which were not identified in the ESP textbook, primarily the ones that the questionnaire results showed as the least familiar to the students. In that way, the insecurities related to the students' use of phrasal verbs would hopefully be diminished which would help building their foreign language confidence.

5. CONCLUSION

English phrasal verbs are one of the most important issues in theoretical study and practical mastery of English language. Their significance, usage and complex nature has always been a subject to discussion. It is a well known fact that one of the prerequisites for fluency in a foreign language is a good command of formulaic expressions and structures, which native speakers have at their unconscious disposal. The facts, that there is a pattern in the structure and that the meaning of the structure is often different from the particular meanings of individual words, make phrasal verbs resemble such expressions.

However, due to the peculiarities often associated with these verbs, research has often been a challenge, particularly in the realm of teaching English for Specific Purposes. Compared to the number of studies on phrasal verbs in general English a little has been done on phrasal verbs in engineering English, particularly in the B/H/S context. Therefore, it was expected that the paper aiming to investigate the role and significance of phrasal verbs in the mechanical engineering register should give its contribution in that respect.

The research carried out at the Faculty of Mechanical engineering addressed the issue by identifying the frequency of phrasal verbs across the engineering texts from different genres (instruction manuals, scientific papers, textbooks) as well as by determining the level of their usage among mechanical engineering students. The research data intended to help upgrading the ESP curriculum at this Faculty proved that phrasal verbs have an important role in mechanical engineering register, particularly in terms of instruction manuals usage. Also, the analysis of the data revealed that the students at the said Faculty who receive instruction in English for Specific Purposes, varying from a year to two years, show significant results in using some of the most frequent verbs typical of this register. However, the fact that almost half of the students do not use these phrasal verbs, or use them incorrectly, implies that the ESP curriculum at the Faculty of Mechanical engineering should be reinforced with a syllabus that would include more materials and activities related to teaching at least those phrasal verbs which are, according to the research, the most frequent ones in the mechanical engineering register.

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FRAZNI GLAGOLI U DISKURSU MAŠINSTVA: STUDIJA SLUČAJA

Sažetak:

Provedeno je nebrojeno mnogo istraživačkih studija koje pokrivaju širok spektar aspekata koji se dovode u vezu sa fraznim glagolima u engleskom jeziku. Međutim, frazni glagoli u mašinskom inženjerskom diskursu su jako malo istraženi, posebno u nastavi engleskog za posebne namjene u bosanskohercegovačkom kontekstu. Ovaj rad je imao za cilj istražiti ulogu fraznih glagola u engleskom tehničkom diskursu, identificirati najčešće frazne glagole u registru mašinskog inženjerstva, te odrediti stepen poznavanja ovih konstrukcija među studentima Mašinskog fakulteta u Zenici..

Ključne riječi: nastava engleskog jezika struke; inženjerski diskurs; frazni glagoli; jednorječni ekvivalent; tendencija izbjegavanja fraznih glagola

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