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## Structural analysis of terms and terminological units of the sphere ‘nuclear energy’ in modern English Tomsk Polytechnic University

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### Abstract

Nowadays there is increase in exchange of information in the sphere of nuclear energy. English is widely used as a global language and means of communication and both specialists and students actively use it for making publications in scientific journals. It is important to know English terminology of the sphere to avoid misuse and misunderstanding. Therefore, either students learning English for specific purposes and specialists using English terminology should be aware of the correct use of terms and terminological units of the sphere. The present article shows the results of the structural analysis of the terms and terminological units of the sphere of ‘nuclear energy’ in modern English. This research is intended to minimize misunderstanding in technical communication in the sphere of nuclear energy.

*Keywords:* Term, terminological unit, structural analysis, modern English;

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### 1. Introduction

Due to fast growing technologies in the sphere of nuclear energy, necessity to give names to new special technical objects exists. Structural analysis of terms and terminological units of the sphere of nuclear energy in English which became a global language used around the world for communication between specialists and those interested in the sphere of nuclear energy will help to understand the way such terms and terminological units are formed and predict possible combinations of parts of speech in a terminological unit according to linguistic norms of English.

Term is a special word used to notify a special object or phenomenon.

Terminological unit is a combination of special words used for notification of special objects or phenomena.

Linguistic norms are set traditional rules used in a language according to which the whole linguistic system functions.

#### 1.1. Methodology

40 special lexical units (terms) have been chosen for linguistic analysis from 2 scientific articles belonging to the sphere of nuclear energy “Development of high-performance heavy density concrete using different aggregates for gamma-ray shielding” and “Experimental study on the sub-atmospheric loop heat pipe passive cooling system for spent fuel pool”. In this research, the

Multitran dictionary and Oxford dictionary have been used to ensure that the words are technical terms.

After that, structural analysis (analysis of parts of speech in a terminological unit) of 40 chosen terms and terminological units has been made (i.e. “nuclear power plant” where “nuclear” is an adjective (Adj.), “power” is a noun (N), and “plant” is a noun (N) too. The structure here is (A + N +N). The structural analysis of terms and terminological units has been based on a number of structural analyses made in different scientific areas [2], [6].

## *1.2. Experimental*

In experimental part, 40 collected terms and terminological units of the sphere of nuclear energy in modern English are presented. The terms and terminological units have been chosen in accordance with the features of a term: ability to name special objects, transparency, content, accuracy and absence of synonyms. There has been found a term with a structure that is unusual for English language “Fly Ash” (Verb + Noun). This structure rarely happens because there is a verb that is used as an Adjective.

The structural analyses of the terms and terminological units of the sphere of nuclear energy in modern English (with parts of speech they consist of)[1][5][3][4]:

1. Atomic number(A+N)
2. Attenuation measurement (N+N)
3. Barite aggregate (N+N)
4. Cement (N)
5. Circulation cooling system (N+PI+N)
6. Fly ash (V+N)
7. Gamma spectrometer (N+N)
8. Goethite (N)
9. Ground granulated blast furnace slag (GGBFS) (N+PII+N+N+N)
10. Half-value layer (HVL) (N-N+N)
11. Heat exchanger (N+N)
12. Heat transfer rate (A+N+N)
13. High performance concrete (HPC) (A+N+N)
14. High-performance heavy density concrete (A-N+A+N+N)
15. Hydrogen(N)
16. Irradiated nuclear fuel (PII+A+N)
17. Latent heat (A+N)
18. Light nuclei (A+N)
19. Linear attenuation coefficient (A+N+N)
20. Long-length evaporator (A-N+N)
21. Loop heat pipe (N+N+N)
22. Magnetite coarse aggregate (N+A+N)
23. Nuclear power plant (NPP) (A+N+N)
24. Nuclear power station (A+N+N)
25. Photon energies (N+N)
26. Photon(N)
27. Radiation (N)
28. Radiology protection (N+N)
29. Reactor shielding (N+N)
30. Residual heat (A+N)

31. Scintillation detector (N+N)
32. Serpentine(N)
33. Silica fume (N+N)
34. Spent fuel pool (SFP) (PII+N+N)
35. Sub-atmospheric (Prefix-A)
36. Tenth-value layer (TVL) (Numeral-N+N)
37. Thermofluid dynamics design (A+N+N)
38. Transient state (A+N)
39. Vaporization (N)
40. Volumetric filling ratio (A+ PI+N)

As we can see from the list of the terms and terminological units presented above, there is a great number of combinations including more than one noun where it has a function of an attribute. The following list shows a number of structural models. According to statistical analysis the most spread model is N + N (8 models):

- (N) = 7
- (A+N+N) = 6
- (N+N) = 8
- (A-N+A+N+N) = 1
- (V+N) = 1
- (N+PII+N+N+N) = 1
- (N-N+N) = 1
- (Numeral-N+N) = 1
- (N+A+N) = 1
- (N+PI+N)= 1
- (PII+N+N) = 1
- (A+N) = 5
- (Prefix-A) = 1
- (A+PI+N)= 1
- (A-N+N)= 1
- (N+N+N)=1

The results of the structural analysis of the terms and terminological units of the sphere of nuclear energy in modern English are presented in figure 1.

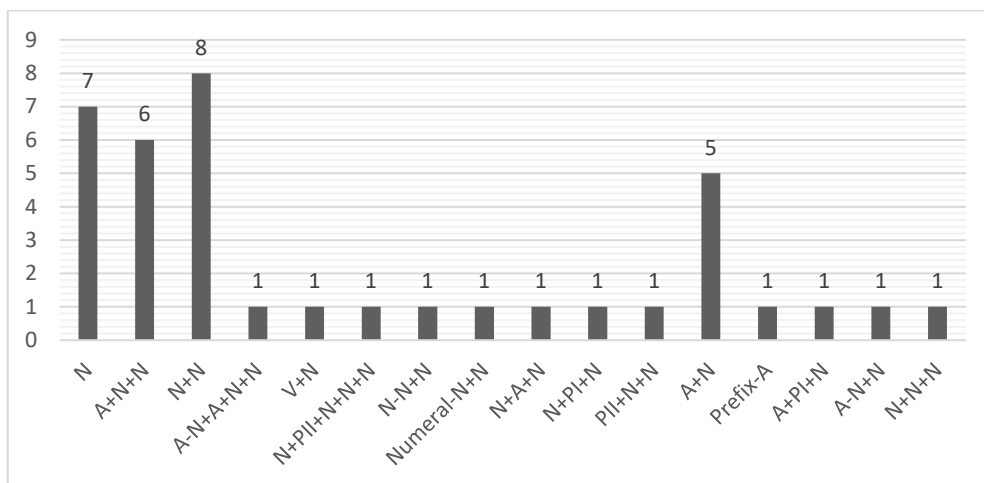


Fig. 1. Structural analysis of terms and terminological units of the sphere of nuclear energy in modern English

## 2. Results

The analysis has shown that among the analyzed 40 terms and terminological units taken from scientific articles of the sphere of nuclear energy there have been found a lot of different structures with different parts of speech. The most common structure is Noun + Noun combination. There is an interesting structure such as “high-performance heavy density concrete” (A-N + A + N + N), there are two different parts of speech (A and N) that became one word with the help of a hyphen, it is called a compound noun. A symbol called a hyphen is usually used in such compound nouns. Hyphens in English combine words consisting of nouns and other parts of speech. Some compound nouns use a hyphen if there are more than one elements in complex nouns (e.g. *power-steering*, *sub-atmospheric*, *high-performance*). Some other compound nouns do not use hyphens (e.g. *thermofluid dynamics design*). According to the result, there are nouns that are identical in the meaning but have different structure with a hyphen and without a hyphen (e.g. *high-performance* and *high performance concrete*).

## 3. Conclusion

Terms and terminological units of the sphere of nuclear energy in modern English are complicated. The structural analysis of the units can help to structurize the terms and terminological units in the terminological system of the sphere of nuclear energy and make the communication between specialists and those interested in sphere of nuclear energy easier. The results of the analysis can be used for the following research of the terminological system. It can help us understand the way terms and terminological units of the sphere of nuclear energy are formed and predict possible combinations of parts of speech in a terminological unit.

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