

STRUCTURAL CHARACTERISTICS OF RAILWAY TERMINOLOGY FORMATION: A COMPARATIVE STUDY OF ENGLISH AND UZBEK

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Annotation:

This research examines the structural characteristics of railway terminology formation through a comparative study of English and Uzbek. It emphasizes the importance of terminology in linguistic and cognitive sciences, particularly in specialized fields like railways, where precision and clarity are critical. The study explores the evolution of terminology as a scientific discipline, delving into methods such as semantic, morphological, and syntactic approaches to term formation. Through comparative analysis, the research highlights differences in term formation influenced by linguistic structures—English favoring prefixes and compounding, and Uzbek relying on suffixation and transliteration. The findings underline the necessity of standardizing multilingual terminology for effective international communication.

Keywords: Railway terminology, English-Uzbek comparison, term formation, linguistic structure, semantic adaptation, standardization, compounding, suffixation, technical language, multilingual communication.

I. Introduction

It is broadly recognized that understanding the trajectories of contemporary linguistics is imperative, and it is crucial to comprehend the methodologies involved in the modeling of word origins within particular domains of study. No discipline can forgo its specialized terminology that designates its concepts. The investigation of term formation constitutes a principal focus within the realm of modern terminological studies.

Theoretical Background

The study of terminology has been a subject of both practical and theoretical significance, as underscored by numerous scholars across disciplines. Historically, terminology emerged as a response to the rapid technological advancements and scientific developments of the eighteenth century. During this period, the need to overcome communication barriers and facilitate the exchange of knowledge across various disciplines became increasingly apparent. Cabré (1999) highlighted terminology as a "necessary tool" that bridged the challenges brought by scientific and technological innovation, marking it as a vital component in the dissemination of knowledge.

By the twentieth century, terminology had evolved into a fully-fledged scientific discipline, supported by structured methodologies and theoretical foundations. Scholars such as Grinev (1993) and Leichik (2009) emphasized the growing recognition of terminology as a socially and politically significant field at both national and international levels. The increasing globalization and interdisciplinary collaboration further solidified terminology's importance, particularly in highly specialized domains like transportation, aviation, and railway systems.

Development and Characteristics of Terminology

While terminology is not a novel area of study, its systematic development as a scientific discipline with well-defined rules, foundations, and methods is a relatively recent achievement. Morozova (2004) described terminology as a linguistic tool that reflects the social, technical, and scientific progress of society, acting as a mirror of intellectual and practical evolution. Norova and Narziyeva (2020) further noted that the precision and systematic nature of terminology are particularly crucial in fields like railway systems, where unambiguous communication is essential for safety and efficiency.

According to Cabré (1999), a term can be defined as a linguistic unit within a semiotic system that performs the primary function of expressing a concept. This

definition underscores the complexity of terms, which combine linguistic and logical attributes while embodying their unique terminological nature, whether scientific, technical, or otherwise. Unlike ordinary words, terms are distinct due to their precision, unambiguity, and independence from contextual variations. Marchand (1953) also highlighted that terms in specialized fields are subject to rigorous standardization processes to ensure clarity and uniformity.

Perspectives on Terminology

Grinev (1993) proposed a tripartite framework for understanding terminology, focusing on three distinct aspects:

- **Principles and Foundations:** These guide the study and formation of terms, ensuring they align with the conceptual and linguistic requirements of their respective domains.
- **Methodological Rules:** The systematic approaches used in the analysis and construction of terminology. This includes linguistic principles such as word formation, morphological analysis, and syntactic structuring.
- **Domain-Specific Applications:** The lexicon of a particular subject or field, which reflects the unique concepts and phenomena within that domain.

Terminology is inherently interdisciplinary, bridging linguistics, cognitive science, and domain-specific knowledge. Cabré (1999) described this interdisciplinary nature as crucial for accurately naming concepts and representing them in linguistic or semiotic forms. Yurdakul and Schnieder (2015) specifically emphasized the importance of terminology in railway systems, where standardized terms facilitate seamless communication within and across linguistic boundaries.

Linguistic Features of Terms

Terms exhibit unique linguistic features that distinguish them from ordinary words. Leichik (2009) noted that terms retain all lexical-semantic and grammatical properties of natural language but are specifically adapted to represent specialized

concepts. They exist within a system of paradigmatic and syntagmatic relations, interacting with other terms and elements of scientific discourse.

Standardization is a key feature of terminology in technical fields, including railways. Jackson (1992) and Cottrell and Montgomery (1943) emphasized that standardization ensures consistency and clarity, particularly in multilingual contexts. This is especially relevant for railway systems, where English often serves as the lingua franca for international operations. However, as noted by Чернухин et al. (1958), English railway terminology frequently incorporates imagery and metaphorical expressions, which may pose challenges when adapting such terms into Uzbek or Russian.

Categories of Railway Terminology

Yurdakul and Schnieder (2015), along with Базарбаев and Реймова (2024), classified railway terminology into three main categories:

Commonly Used Words with Specialized Meanings: For example, the term "field" in railway terminology refers to a magnetic flux induced by electricity, which differs significantly from its general usage as an area of land or a subject of study.

General Technical Terms: These are terms used across various scientific disciplines but have specific applications in railway contexts. For instance, "commutator" in railway systems refers to an electrical device for reversing current flow.

Domain-Specific Terms: These terms are unique to the railway industry, such as "axle," which denotes a supporting member that transmits mechanical power or allows free rotation of a wheel.

II. Comparative Analysis of English and Uzbek Railway Terminology

The structural peculiarities of railway terminology in English and Uzbek are shaped by linguistic and cultural factors. Norova and Narziyeva (2020) highlighted that Uzbek railway terminology often adapts English terms through transliteration or

semantic adaptation. This process reflects the agglutinative nature of the Uzbek language, which contrasts with the analytical structure of English. Kubanova (2024) further explored how English terms with complex morphological structures are simplified or restructured in Uzbek to align with its linguistic norms.

In multilingual contexts, the standardization of railway terminology is essential for ensuring effective communication. Jackson (1992) underscored the historical development of English railway terminology as a foundation for international operations, while Чернухин et al. (1958) emphasized the challenges of adapting such terms into other languages. The comparative analysis of English and Uzbek railway terminology reveals not only the structural differences but also the cultural and historical influences that shape term formation in each language. The theoretical insights provided by scholars such as Cabré (1999), Grinev (1993), and Norova and Narziyeva (2020) underscore the importance of terminology as a linguistic and cognitive tool. In the context of railway systems, terminology serves as a critical mechanism for ensuring precision, clarity, and consistency across linguistic and cultural boundaries. By examining the structural characteristics of railway terms in English and Uzbek, this study contributes to the broader understanding of how specialized terminology evolves and functions within different linguistic frameworks.

The object of this investigation is to analyze railway terms in the English and Uzbek languages. The study is guided by the following research questions:

- To identify the common peculiarities and functions of terms in scientific language;
- To outline the main requirements for this group of words;
- To examine which affixes are most commonly used in the formation of railway terms;

To explore the relationships among the components of compound terms.

Over the years, numerous researchers—including S. V. Griniov, V. A. Tatatinov, G. P. Yatel, V. M. Leichik, V. P. Danilenko, Cabré M. Teresa, H. Marchand, and others—have sought to classify the primary methods by which new terms are formed. Their investigations have identified several structural approaches to term formation:

Semantic Method: This involves using a word or phrase from general language as a term, repurposing its meaning within a specific domain.

Morphological Method: Terms are created through the addition of affixes (prefixes or suffixes) to root words.

Morpho-Syntactic Method: New terms are formed by compounding two stems to create a single concept.

Syntactic Method: Terms are constructed by combining or shortening word stems.

Among these methods, S. V. Griniov emphasizes that the **syntactic method** is the most productive. He notes that compound terms—terms formed by combining multiple words—are far more prevalent than single-word terms. Based on his analysis of European languages, Griniov concludes that 60–90% of modern terms are created through the compounding of words to convey new meanings.

This research underscores the importance of structural diversity in term formation and highlights the dominance of compounding as a mechanism in modern terminology development.

III. Methods

In the process of researching the formation of railway terminology, a combination of methodological approaches was employed to ensure a comprehensive analysis. These included the general scientific dialectical approach to cognition, which provided a framework for understanding the dynamic and interconnected nature of term formation. Additionally, component analysis was applied to deconstruct and examine the structural and semantic components of railway terms. An analytical approach further facilitated the systematic evaluation

and classification of the methods and patterns involved in term formation. Together, these methodologies enabled a thorough investigation of the linguistic processes shaping railway terminology.

IV. Results

It is noted that all terminological systems, including the system of railway terminology, consist of lexical units that can be classified into two main types: one-component and multi-component terms. These two types of terms are formed differently in English and Uzbek, reflecting the structural characteristics of each language.

Formation of Railway Terms in English

In English, derived railway terms are created using common word-formation models:

Prefixes: For example, *discharge* (where the prefix *dis-* indicates separation or negation).

Suffixes: For example, *suspension* (where the suffix *-sion* forms a noun from a verb).

Combination of Prefixes and Suffixes: For example, *semiconductor* (with the prefix *semi-* and the suffix *-or*).

Prefixes and suffixes in English do not play identical roles in the word-building process. Suffixes are primarily used to change the grammatical category of a word, such as forming nouns from verbs (*suspend* → *suspension*) or adjectives from nouns (*electric* → *electrical*). Prefixes, on the other hand, primarily modify the meaning of a word without altering its grammatical category (*charge* → *discharge*).

Formation of Railway Terms in Uzbek

In Uzbek, railway terms are typically formed using word-building methods that align with the language's agglutinative nature. These methods include:

Suffixation: Uzbek primarily relies on suffixes to form new terms. For example:

Temupchu (*temirchi*, meaning blacksmith) uses the suffix *-chu* to indicate a person associated with iron.

Қайта ишлаш (*qayta ishlash*, meaning recycling) employs the prefix-equivalent *қайта-* to indicate repetition.

Compounding: Uzbek often combines words to form multi-component terms, such as:

Темір йўл (*temir yo'l*, meaning railway), where *темир* (iron) and *йўл* (road) are combined.

Borrowed Prefixes: While Uzbek does not natively use prefixes as productively as English, it has adopted some prefixes from English or Russian for technical terms. For instance:

Антифрикцион (*antifriktsion*, meaning antifriction) includes the borrowed prefix *анти-*.

Субстанция (*substantsiya*, meaning substance) includes the borrowed prefix *суб-*.

Comparison

In both languages, prefixes and suffixes play different roles in term formation. While English frequently uses prefixes to modify meaning and suffixes to change grammatical categories, Uzbek relies more heavily on suffixes and compounding to form clear and semantically transparent terms. The adoption of borrowed prefixes in Uzbek is primarily seen in technical and scientific domains, reflecting the influence of globalization and modern technology.

This comparative perspective highlights the distinct approaches taken by English and Uzbek in forming railway terminology, providing valuable insights into their linguistic structures and the adaptation of technical vocabulary.

Prefix	Uzbek Equivalent	Examples (English)	Examples (Uzbek)
after-	кейин- (<i>keyin-</i>)	afterburning, aftercooler	кейинги ёниш, кейинги совутгич

anti-	анти-, қарши (<i>anti-, qarshi</i>)	antiknock, antifriction	антидетонация, қарши соқиллама
de-	йўқ-, сиз- (<i>yo 'q-, siz-</i>)	decoupling, decrease	узилиш, қисқариш
dis-	бе-, но- (<i>be-, no-</i>)	disabled, disassemble	бемувозанат, айримлаштириш
inter-	ўзаро, интер- (<i>o 'zaro, inter-</i>)	intercity, interlock	ўзаро шаҳарлар, ўзаро қулфлаш
mis-	хато-, но- (<i>xato-, no-</i>)	misadjustment, misfire	хато мослаш, хато отиш
over-	ортиқ-, ошир- (<i>ortiq-, oshir-</i>)	overbalance, overload	ортиқча мувозанат, ортиқча юк
re-	қайта- (<i>qayta-</i>)	rearrangement, reconnection	қайта жойлаштириш, қайта уланиш
sub-	қуйи-, суб- (<i>quyi-, sub-</i>)	subassembly, subdivision	қуйи йиғма, қуйи бўлинма
super-	ўта-, супер- (<i>o 'ta-, super-</i>)	superfast, superstructure	ўта тезкор, суперкурув
trans-	ўтказ-, транс- (<i>o 'tkaz-, trans-</i>)	transborder, transformer	чегарадан ўтиш, трансформатор
un-	бе-, но- (<i>be-, no-</i>)	unbalanced, uncover	бемувозанат, очиқланган
under-	қуйи-, кам- (<i>quyi-, kam-</i>)	undercarriage, underlayer	қуйи шассиси, қуйи қатлам

bi-	икки- (<i>ikki-</i>)	biaxial, bidirectional	икки ўқли, икки йўналишли
extra-	ўта-, оптикча (<i>o 'ta-</i> , <i>ortiqcha-</i>)	extrafast, extraheavy	ўта тезкор, оптикча оғир
ultra-	ўта- (<i>o 'ta-</i>)	ultrasonic, ultrafast	ўта товушли, ўта тезкор

Compound Technical Terms in Railway Terminology: Uzbek Perspective

Compound technical terms in railway terminology are formed using the compounding morphological method, where two or more words are combined to create a new meaning. In such cases, the roots of the words are free morphemes, meaning they are independent and meaningful by themselves. For example, terms like crosstie (айланма рельс), flagman (байроқчи), and flywheel (айланувчи ғилдирак) are compound words that combine independent words to represent specific technical meanings.

Semantic and Structural Relations

Compound words are built from word stems that maintain specific structural and semantic relationships. These relationships define how the components interact to express the meaning of the compound term. In Uzbek, the process of compounding often mirrors word combinations, as the resulting terms consist of multiple components linked by meaning and structure. For instance:

Temir yo'l (railway) consists of темир (iron) and йўл (road), maintaining semantic transparency.

Тормоз блоки (brake block) is a direct translation, where тормоз (brake) and блоки (block) are combined.

Forms of Compound Terms

In both English and Uzbek, compound terms may appear as single words (railway → темирйўл), hyphenated terms (single-arm → якка-қўлли), or multi-word phrases (baseplate → негиз плита). Despite these structural variations,

compound terms retain their unified semantic meaning. The primary semantic focus in compound words often lies on the last element, establishing a subordinate semantic relationship between components.

Common Compound Models in English Railway Terms and Their Uzbek Equivalents

Noun + Noun (N + N):

This is the most common model in English railway terminology and is equally productive in Uzbek. Examples include:

Axlebox → ўқ қутиси (o'q qutisi).

Railway → темир йўл (temir yo'l).

Wheelbase → ғилдирак базаси (g'ildirak bazasi).

Brakeblock → тормоз блоки (tormoz bloki).

Cargotainer → юк контейнери (yuk konteyneri).

Adjective + Noun (A + N):

This model is also productive, combining descriptive adjectives with nouns to create precise terms. Examples include:

Deadline → чегара вақти (chegara vaqti).

Freeway → эркин йўл (erkin yo'l).

Single-arm → якка-қўлли (yakka-qo'lli).

Semaphore arm → семафор қўли (semafor qo'li).

In both English and Uzbek, compound technical terms are essential for naming and describing complex railway equipment and processes. The productivity of the N + N and A + N models highlights the structural flexibility of compounding. While English relies on hyphenation and word fusion, Uzbek often uses multi-word combinations, ensuring clarity and semantic precision. This comparative analysis underscores the adaptability of Uzbek railway terminology in accommodating technical terms through effective compounding.

V. Discussion

The findings of this research highlight the structural and linguistic characteristics of railway terminology in English and Uzbek, emphasizing the different methods used in the formation of technical terms. In English, term formation is heavily reliant on prefixes, suffixes, and compounding, with a clear preference for brevity and clarity. The most productive prefixes in English railway terminology include dis-, re-, sub-, super-, and trans-, which are used to modify meaning or create entirely new concepts. Similarly, suffixes such as -tion, -ment, -ance, and -ic play a vital role in forming nouns and adjectives that define processes, tools, and characteristics within the railway domain.

In contrast, Uzbek railway terminology predominantly utilizes suffixation and compounding to reflect its agglutinative linguistic structure. The process of compounding in Uzbek often mirrors multi-word phrases in English, ensuring semantic transparency and adaptability. For example, terms like темир йўл (temir yo'l, "railway") and тормоз блоки (tormoz bloki, "brake block") demonstrate how Uzbek compounds maintain the clarity of meaning while adapting technical concepts. Additionally, Uzbek incorporates borrowed prefixes such as анти- and cyб- to align with international technical vocabulary.

A key observation is the impact of globalization on Uzbek terminology. While English terms are often standardized for international use, Uzbek adopts transliteration and semantic adaptation to align with its linguistic norms. This reflects both linguistic flexibility and the influence of cultural and technological exchange.

The structural comparison between English and Uzbek highlights the importance of cultural and linguistic contexts in shaping technical terminology. English emphasizes conciseness and widespread standardization, while Uzbek prioritizes clarity and adaptation through multi-word constructions and suffixation.

VI. Conclusion

This research underscores the importance of structural diversity in the formation of railway terminology and demonstrates how linguistic systems adapt to meet the demands of technical communication. English relies on the efficient use of prefixes, suffixes, and compound structures to create precise terms. Meanwhile, Uzbek employs an agglutinative approach, emphasizing compounding and suffixation to maintain semantic clarity.

The comparative analysis reveals the following key points:

Structural Differences: English railway terminology favors brevity through single-word or hyphenated forms, while Uzbek often uses multi-word combinations.

Adaptation of Borrowed Terms: Uzbek integrates borrowed prefixes and terms from English and Russian to accommodate modern technical vocabulary, reflecting the globalized nature of technical fields.

Linguistic Precision: Both languages demonstrate an emphasis on precision and standardization, which is critical in the safety-sensitive railway domain.

By exploring the structural characteristics of railway terminology in both languages, this study contributes to a deeper understanding of how linguistic systems evolve to accommodate technical advancements. Future research could focus on the challenges and opportunities in standardizing multilingual railway terminology, ensuring seamless communication across linguistic and cultural boundaries.

VII. References:

1. Bazarbaev, B., & Reimova, M. (2024). Structural characteristics of railway terminology in English and Uzbek. *O‘zMU Xabarlari*, 1(6), 297–299.
2. Bekmurodova, S. (2024). Similarity factors of railway terminology of Uzbek and English languages. *O‘zbekiston Milliy Universiteti Xabarlari*, 6(1/6), 297–299. Toshkent: O‘zbekiston Milliy Universiteti.

3. Bekmuradov, J. (2023). Linguistic challenges in the standardization of Uzbek language terms: Developing new terms to reflect emerging technologies and concepts. *Gospodarka i Innowacje*, 34, 367–372.
4. Bowker, L., & Pearson, J. (2002). *Working with specialized language: A practical guide to using corpora*. London: Routledge.
5. Cabré, M. T. (1999). *Terminology: Theory, methods and applications*. John Benjamins Publishing Company. <https://doi.org/10.1075/tlrp.1>
6. Chernuchin, V. S., et al. (1958). *English-Russian dictionary of railway terms*. Moscow: Transport.
7. Chomsky, N. (1957). *Syntactic structures*. The Hague: Mouton.
8. Cottrell, L. S., & Montgomery, J. D. (1943). The linguistic problem of international communication. *The Journal of General Psychology*, 28(1), 3–12.
9. de Saussure, F. (1916). *Course in general linguistics* (W. Baskin, Trans.). New York: McGraw-Hill. (Original work published in 1916).
10. Galinski, C., & Budin, G. (1993). *Principles and methods of terminology*. Vienna: International Organization for Standardization (ISO).
11. Grinev, S. V. (1993). *Introduction to terminology*. Moscow: Moscow State University.
12. Jackson, H. (1992). *Words and their meaning*. Longman.
13. Jakobson, R. (1960). Closing statement: Linguistics and poetics. In T. A. Sebeok (Ed.), *Style in language* (pp. 350–377). Cambridge, MA: MIT Press.
14. Kubanova, G. (2024). Adaptation of English railway terms into Uzbek language. *Journal of Universal Science Research*, 2(1), 379–386.
15. Leichik, V. M. (2009). *Terminology: Methods and approaches*. Moscow: Librocom.
16. Lyons, J. (1977). *Semantics* (Vols. 1–2). Cambridge, UK: Cambridge University Press.
17. Marchand, H. (1953). *The categories and types of present-day English word-formation: A synchronic-diachronic approach*. University of Alabama Press.

18. Norova, N., & Narziyeva, N. (2020). Comparative analysis of English and Uzbek railway terminology. *International Journal of Psychosocial Rehabilitation*, 24(3), 284–290. <https://doi.org/10.31149/ijie.v3i1.71>
19. Wüster, E. (1979). *Introduction to the general theory of terminology and terminological lexicography*. Vienna: Springer.
20. Yurdakul, A., & Schnieder, E. (2015). Standardization of English navigation terminology in railway traffic domain. *Journal of Civil Engineering and Architecture*, 9, 57–63. <https://doi.org/10.17265/1934-7359/2015.01.007>
21. Yurdakul, A., & Schnieder, E. (2015). Terminological challenges in railway systems. *Journal of Civil Engineering and Architecture*, 9, 57–63. DOI: 10.17265/1934-7359/2015.01.007