
Semantic field analysis of railway terminology in English and Uzbek: a comparative lexicological study

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Annotation *The rapid globalization of railway transport has increased the need for accurate bilingual terminology in engineering, logistics, passenger service, and technical translation. This paper presents a comparative lexicological study of railway terminology in English and Uzbek through the framework of semantic field theory. The study organizes approximately 300 railway terms into seven semantic fields: infrastructure, rolling stock, signaling, passenger service, freight transport, safety, and station terminology. It then compares the lexical-semantic structure of these fields in order to identify dominant conceptual areas, types of equivalence, lexical gaps, and major patterns of term formation in Uzbek. The analysis shows that English railway terminology is highly lexicalized, especially in infrastructure, signaling, and safety, while Uzbek terminology has a hybrid structure shaped by native Turkic word formation, Russian borrowings, international terms, and descriptive translations. The findings are relevant for translators, terminology planners, technical writers, and researchers working with English–Uzbek transport vocabulary.*

Keywords *Semantic field, railway terminology, lexicology, comparative linguistics, English, Uzbek, lexical equivalence, term formation, borrowing, lexical gap*

Ingliz va o'zbek tillarida temir yo'l terminologiyasining semantik maydon tahlili: qiyosiy leksikologik tadqiqot

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Annotatsiya *Temir yo'l transportining tez globallasuvi muhandislik, logistika, yo'lovchilarga xizmat ko'rsatish va texnik tarjima sohalarida aniq ikki tilli terminologiyaga ehtiyojni oshirdi. Ushbu maqolada semantik maydon nazariyasi doirasida ingliz va o'zbek tillarida temir yo'l terminologiyasining qiyosiy leksikologik tadqiqoti keltirilgan. Tadqiqotda taxminan 300 ta temir yo'l atamaları yetti semantik sohaga ajratilgan: infratuzilma, harakatlanuvchi tarkib, signalizatsiya, yo'lovchilarga xizmat ko'rsatish, yuk tashish, xavfsizlik va stansiya terminologiyasi. Keyin u o'zbek tilida dominant kontseptual sohalar, ekvivalentlik turlari, leksik bo'shliqlar va atama hosil bo'lishining asosiy naqshlarini aniqlash uchun ushbu sohalarining leksik-semantik tuzilishini taqqoslaydi. Tahlil shuni ko'rsatadiki, ingliz temir yo'l terminologiyasi, ayniqsa infratuzilma, signalizatsiya va xavfsizlik sohasida yuqori darajada leksiklashtirilgan, o'zbek terminologiyasi esa mahalliy turkiy so'z hosil bo'lishi, ruscha o'zlashtirishlar, xalqaro atamalar va tavsifli tarjimalar bilan shakllangan gibrid tuzilishga ega. Ushbu topilmalar tarjimonlar, terminologiya rejalashtiruvchilari, texnik yozuvchilar va ingliz-o'zbek transport lug'ati bilan ishlaydigan tadqiqotchilar uchun dolzarbdir.*

Kalit so'zlar *Semantik soha, temir yo'l terminologiyasi, leksikologiya, qiyosiy tilshunoslik, ingliz, o'zbek, leksik ekvivalentlik, atama hosil bo'lishi, o'zlashtirish, leksik bo'shli*

**Семантический анализ
железнодорожной
терминологии на английском
и узбекском языках:
сравнительное
лексикологическое
исследование**

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Аннотация Быстрая глобализация железнодорожного транспорта обусловила потребность в точной двуязычной терминологии в области инженерии, логистики, пассажирского обслуживания и технического перевода. В настоящей статье представлено сравнительное лексикологическое исследование железнодорожной терминологии в английском и узбекском языках в рамках теории семантического поля. В ходе исследования около 300 железнодорожных терминов объединены в семь семантических полей: инфраструктура, подвижной состав, сигнализация, пассажирский сервис, грузовые перевозки, безопасность и терминология вокзала. Далее сопоставляется лексико-семантическая структура этих полей с целью выявления доминирующих концептуальных зон, типов эквивалентности, лексических лакун и основных моделей образования терминов в узбекском языке. Анализ показывает, что английская железнодорожная терминология обладает высокой степенью лексикализации, особенно в области инфраструктуры, сигнализации и безопасности, тогда как узбекская терминология представляет собой гибридную систему, формируемую нативным тюркским словообразованием, русскими заимствованиями, международными терминами и описательными переводами.

Ключевые слова Семантическое поле, железнодорожная терминология, лексикология, сравнительное языкознание, английский язык, узбекский язык, лексическая эквивалентность, терминообразование, заимствование, лексическая лакуна

Introduction

Railway transport is not only a technical system but also a specialized communicative domain. Engineers, station workers, conductors, logistics specialists, translators, and passengers all rely on terms that must be precise, stable, and mutually understandable. When railway cooperation crosses national and

linguistic borders, terminology becomes even more important. A mistranslated term may cause confusion in documentation, training, ticketing, safety instructions, or freight operations. For this reason, comparative research on railway terminology is useful both for linguistics and for practical transport communication.

Railway terminology forms a structured subsystem of the lexicon. Terms are not isolated labels; they belong to conceptual groups such as track structure, rolling stock, movement control, safety, passenger service, and freight handling. These groups can be studied through semantic field theory, which views vocabulary as an organized network of meanings. From this perspective, the meaning of a term is partly determined by its relation to neighboring terms inside the same field. For example, platform, station, terminal, stop, and depot are related, but they do not name the same concept. Similarly, rail, sleeper, ballast, switch, and gauge belong to the field of infrastructure, yet each marks a different technical feature.

The present paper applies this approach to railway terms in English and Uzbek. English has a long railway tradition and a highly developed technical vocabulary, much of which has become internationally influential. Uzbek railway terminology, by contrast, reflects several historical layers: native Turkic vocabulary, Russian influence from the Soviet period, international technical borrowings, and recent attempts to use Uzbek word-formation resources more actively. The comparison therefore reveals not only lexical differences, but also different histories of technological naming.

Literature review and Theoretical framework

The concept of semantic field is usually associated with the work of Trier and later developments in European structural semantics. The basic idea is that lexical items are connected through shared domains of meaning. Coseriu expanded this approach by showing that lexical meaning may be understood through oppositions, solidarities, and systematic relations between words (Coseriu, 1967). Later works in lexical semantics, including those by Lyons and Cruse, further emphasized sense relations such as synonymy, hyponymy, meronymy, and lexical contrast. These relations are especially visible in

technical terminology, because technical fields require clear conceptual boundaries (Lyons, 1977), (Cruse, 1986).

Terminology studies also contribute to the analysis. Classical terminology theory, associated with Wüster, treated terms as designations of clearly defined concepts (Wüster, 1979). More recent approaches, including communicative terminology theory (Cabr  , 1999), recognize that terms function in real texts and professional situations. Railway terminology demonstrates this dual nature very clearly. On the one hand, many terms must be standardized for safety and regulation. On the other hand, workers and passengers may use shortened, borrowed, or colloquial forms that coexist with official equivalents.

For English-Uzbek comparison, semantic field analysis is useful because it moves beyond simple word-for-word translation. A dictionary may give locomotive as *lokomotiv* and freight car as *yuk vagoni*, but terms such as *siding* or *commuter* require contextual explanation. These cases show why equivalence must be studied within fields, not as isolated words.

Research Questions

The study is guided by three research questions. First, which semantic fields dominate English and Uzbek railway terminology? Second, which fields show full equivalence, partial equivalence, or lexical gaps when English and Uzbek terms are compared? Third, how does Uzbek railway terminology reflect borrowing, calquing, descriptive translation, and native word formation? These questions make it possible to describe both the structure of the vocabulary and the linguistic mechanisms through which Uzbek railway terms are created or adapted.

Methodology

The study used a qualitative comparative lexicological design supported by basic semantic categorization. A purposeful sample of approximately 300 railway terms was compiled from English railway dictionaries and technical materials, Uzbek railway-related

regulations and professional usage, and bilingual technical dictionaries. The purpose was not to produce a complete dictionary, but to select representative terms from the major areas of railway communication. The selected terms were grouped into seven semantic micro-fields: infrastructure, rolling stock, signaling, passenger service, freight transport, safety, and station terminology.

Each term was examined according to three criteria: semantic field membership, degree of equivalence, and Uzbek term-formation mechanism. Full equivalence was assigned when both languages used terms with nearly identical semantic boundaries, such as locomotive and *lokomotiv*. Partial equivalence described overlap with differences in scope, as in *bogie* and *telejka*. Lexical gap was assigned when one language had a compact term but the other required a descriptive phrase. Uzbek formation was classified as borrowing, calquing, descriptive translation, or native derivation.

Results and Discussion

The analysis shows that both English and Uzbek have developed railway vocabularies, but the density and internal organization of their semantic fields are not identical. English is especially strong in infrastructure, signaling, and safety terminology. This reflects the early development of railways in the English-speaking world and the long history of technical standardization in English railway engineering. Terms such as gauge, switch, crossing, interlocking, derailment, buffer stop, turnout, and track circuit are compact and strongly lexicalized.

Uzbek terminology is rich in rolling stock and passenger service vocabulary, and many terms are widely recognizable in everyday railway communication. Terms such as *poyezd*, *vagon*, *lokomotiv*, *bekat*, *chipta*, *yo'loychi*, *yuk vagoni*, and *provodnik* are common in both professional and public contexts. However, several infrastructure and safety concepts are often expressed through longer descriptive forms.

Dominant Semantic Fields

Infrastructure contains many of the most important technical concepts in both languages. English often uses short terms with specialized meanings, such as rail, sleeper, switch, points, ballast, siding, and gauge. Uzbek equivalents may be native, borrowed, or descriptive: *rels*, *shpala*, *strelka*, *ballast*, *yon yo'ol*, and *rels izi kengligi*. In this field, English tends to be more compact, while Uzbek sometimes uses combinations that explain the function of the object.

Rolling stock shows a high degree of international similarity. Locomotive, wagon, carriage, passenger car, freight car, and coach often have equivalents that are borrowed or calqued in Uzbek: *lokomotiv*, *vagon*, *yo'loychi vagoni*, *yuk vagoni*. This field has fewer serious lexical gaps because railway vehicles are visible, frequently discussed, and strongly standardized. Signaling, however, shows a different pattern. English contains highly specific terms such as signal box, interlocking, semaphore, block section, and track circuit. Uzbek frequently relies on Russian borrowings or descriptive technical expressions.

Passenger service and station terminology are more culturally visible. Uzbek has many everyday terms related to passengers, tickets, stations, and travel roles. Freight terminology is also comparatively developed because cargo classification, loading, and documentation require precision. Safety terminology is the most challenging field for equivalence. English often has a single term for incidents or protective devices, while Uzbek may use verbal nouns or descriptive phrases to explain the event.

Semantic Field	English Dominance	Uzbek Dominance	Main Characteristics
Infrastructure	High	Moderate	English uses compact technical lexemes; Uzbek often combines borrowings with descriptive phrases.
Rolling Stock	High	High	Both languages have rich taxonomies for locomotives, wagons, coaches, and train types.
Signaling	Very high	Moderate	English is highly lexicalized; Uzbek frequently uses Russian borrowings and explanatory forms.
Passenger Service	Moderate	High	Uzbek has many practical terms for passengers, tickets, conductors, and station routines.
Freight Transport	High	High	Both languages require precision for cargo classification, wagons, loading, and documentation.
Safety	High	Low to moderate	English has compact incident and device terms; Uzbek often uses verbal nouns or descriptions.
Station Terminology	Moderate	Moderate	Similarity is supported by shared operational practices and international station procedures.

Table 1. *Distribution of Core Terms across Semantic Fields*

Equivalence, Partial Correspondence, and Lexical Gaps

Full equivalence is most common in internationalized terms and in areas where the same object is recognized across railway systems. Lokomotiv, semafor, depo, and vagon are typical examples. These terms are easy for translators because the conceptual boundaries are nearly the same. Calques such as yuk vagoni also show strong equivalence because the components directly express the function of the object.

Partial equivalence is common where a borrowed word has a broader meaning in Uzbek or Russian-influenced usage than the English technical term. For example, bogie refers to the wheeled frame under a rail vehicle, while telejka may also mean a cart or trolley in general language. Similarly, points or switch

can correspond to strelka, but the exact meaning depends on the technical context.

Lexical gaps are especially important for translators. A lexical gap does not necessarily mean that a language cannot express a concept; it means that the language may lack a compact, conventional, single-word equivalent. Siding, commuter, derailment, and buffer stop are examples where Uzbek often needs descriptive translation. For siding, possible renderings include yon yo'ol or asosiy yo'lga ulangan qo'shimcha yo'ol, depending on the level of technical precision. For derailment, izdan chiqish is understandable and widely usable, but English differentiates several accident-related terms more systematically.

Semantic Field	English Term	Uzbek Equivalent	Equivalence Type
Infrastructure	Railway / railroad	Temir yo'ol	Full equivalence / calque
Infrastructure	Gauge	Rels izi kengligi	Partial / descriptive
Infrastructure	Siding	Yon yo'ol; qo'shimcha yo'ol	Lexical gap / descriptive
Rolling stock	Locomotive	Lokomotiv	Full equivalence / borrowing
Rolling stock	Freight car	Yuk vagoni	Full equivalence / calque
Rolling stock	Bogie	Telejka	Partial / Russian borrowing
Signaling	Semaphore	Semafor	Full equivalence / borrowing
Signaling	Points / switch	Strelka	Partial / Russian borrowing
Passenger service	Conductor	Provodnik	Full equivalence / borrowing
Passenger service	Commuter	Qatnovchi yo'loychi	Lexical gap / descriptive
Safety	Derailment	Izdan chiqish	Partial / descriptive
Safety	Buffer stop	Yo'ol oxiri to'sig'i	Partial / descriptive

Table 2. *Equivalence and Lexical Gaps in Railway Terminology*

Term Formation in Uzbek Railway Terminology

Uzbek railway terminology is a hybrid system. Borrowing is the most visible mechanism in the fields of rolling stock and signaling. Many railway terms entered Uzbek through Russian during the Soviet period, including vagon, depo, strelka, provodnik, semafor, and lokomotiv. These forms are phonologically and orthographically adapted to Uzbek, but their historical origin remains visible. Borrowings are useful because they provide short and internationally recognizable labels, but they may also reduce transparency for speakers who do not know the source language.

Calquing and descriptive translation are also important. Temir yo'ol literally means iron road and functions as a transparent equivalent of railway. Yuk vagoni combines the native word yuk with borrowed vagon, while tezyur poyezd uses native and borrowed components to express high-speed train. These examples show that Uzbek can combine inherited and borrowed elements productively. Descriptive translation is especially useful when no stable term exists, but it may create long expressions

that are difficult to use in tables, manuals, or signs.

Native word formation appears through compounding and suffixation. Uzbek is an agglutinative language, so it can create new technical forms by adding suffixes to native roots. Words connected with movement, service, and agency can be formed through productive patterns, as in harakatlanuvchi tarkib for rolling stock and yo'loychi for passenger. The challenge is standardization: several possible Uzbek forms may exist for one technical concept, and only consistent professional usage can determine which form becomes dominant.

Practical implications

The findings have several practical implications. First, English–Uzbek railway dictionaries should not simply list equivalents; they should identify field membership and equivalence type. A translator needs to know whether a term is fully equivalent, partially equivalent, or descriptive. Second, safety and infrastructure terms require special attention because they are the fields where lexical gaps and partial equivalence are most likely to cause misunderstanding. Third, terminology planning

in Uzbek should balance international recognizability with native transparency. Some borrowings are already stable and should probably remain, while other concepts may benefit from clearer Uzbek calques.

Limitations

A final methodological note is that future research should test these semantic-field observations with corpus data from manuals, station notices, and translated regulations, because actual frequency may differ from dictionary representation in several specialized railway contexts.

Conclusion

This paper examined English and Uzbek railway terminology through the lens of semantic field theory. The analysis showed that English railway vocabulary is highly lexicalized in infrastructure, signaling, and safety, while Uzbek terminology combines native forms,

Russian borrowings, international technical terms, calques, and descriptive phrases. Full equivalence is common in standardized international terms, partial equivalence appears in operational vocabulary, and lexical gaps are most visible in safety and infrastructure concepts.

The study confirms that railway terminology is not merely a set of isolated words. It is a structured lexical system shaped by technology, history, professional practice, and language policy. For Uzbek, the main development task is not to replace all borrowed terms, but to standardize the relationship between borrowed, calqued, and native forms. A semantic field approach can help build more accurate dictionaries, improve translation quality, and support clearer railway communication between English and Uzbek users.

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