

HYPONYMIC RELATIONS IN RAILWAY TERMINOLOGY AND ENSURING SEMANTIC CORRESPONDENCE IN TRANSLATION

Mirsagatova Dilorom,

Uzbekistan World Languages University

dilorom.mirsagatova@uzwlu.uz

Abstract. This paper examines hyponymic relations — hierarchical genus-species semantic structures — within English and Uzbek railway terminology, and analyses the challenges these structures pose for achieving semantic correspondence in translation. Hyponymy organises technical vocabulary into taxonomic chains in which a superordinate term (hypernym) covers a class of more specific terms (hyponyms), and the translational task requires not only finding formal equivalents but reproducing the correct level of specificity. Drawing on bilingual documentation from Uzbekistan Railways, UIC multilingual terminology resources, and a comparative corpus of English and Uzbek railway technical texts, the study identifies three principal translation problems arising from hyponymic asymmetry: hypernym-to-hyponym shifts, where a source-language term at one level of specificity is rendered by a target-language term at a different level; lexical gap cases, where a hyponym attested in one language has no dedicated term at the equivalent level in the other; and taxonomy divergence, where the classificatory structures themselves do not map onto each other because the two languages organised the domain under different engineering traditions. Each problem type is illustrated with documented examples from traction systems, track infrastructure, signalling, and rolling stock. Translation strategies — including compensatory specification, parenthetical clarification, and terminographic annotation — are evaluated for each case. The findings have direct relevance for railway technical translators, Uzbek terminographers, and institutions engaged in aligning Uzbek professional-language standards with international railway norms.

Keywords: railway terminology, hyponymy, hypernym, semantic correspondence, English-Uzbek translation, terminological hierarchy, lexical gap, taxonomy divergence, technical translation, Uzbek professional language.

Annotatsiya. Ushbu maqolada ingliz va o'zbek temir yo'l terminologiyasidagi giponimik munosabatlar — ierarxik tur-jins semantik tuzilmalar — o'rganiladi hamda ushbu tuzilmalarning tarjimada semantik moslikni ta'minlashga qo'yadigan muammolari tahlil etiladi. Giponimiya texnik lug'atni taksonomik zanjirlarga uyushtiradi: umumiy atama (giperanim) o'ziga xos atamalar (giponimlar) sinfini qamrab oladi; tarjimon nafaqat rasmiy muqobillarni topishi, balki aniqlik darajasini ham to'g'ri uzatishi kerak. O'zbekiston Temir Yo'llari ikki tilli hujjatlari, UIC ko'p tilli terminologiya resurslari va ingliz-o'zbek temir yo'l texnik matnlari qiyosiy korpusi asosida giponimik assimetriyadan kelib chiqadigan uch asosiy tarjima muammosi aniqlanadi: giperanim-giponim siljishi — manba tildagi atama aniqlik darajasi bo'yicha boshqa darajadagi maqsad til atamasi bilan o'giriladi; leksik bo'shliq holatlari — bir tilda mavjud giponim ikkinchi tilda teng darajada alohida atamaga ega emas; va taksonomik tofovut — ikki til muhandislik an'analari farqi sababli mavzuni har xil tarzda tasniflagani uchun tasnif tuzilmalari o'zaro mos kelmaydi. Har bir muammo turi traktor tizimlari, yo'l inshootlari, signalizatsiya va harakatlanuvchi tarkib sohasidan hujjatlangan misollar bilan ko'rsatiladi.

Kalit so'zlar: temir yo'l terminologiyasi, giponimiya, giperanim, semantik moslik, ingliz-o'zbek tarjimasi, terminologik ierarxiya, leksik bo'shliq, taksonomik tofovut, texnik tarjima, o'zbek kasbiy tili.

Аннотация. В статье исследуются гипонимические отношения — иерархические семантические структуры типа «род — вид» — в английской и узбекской железнодорожной терминологии, а также анализируются связанные с ними трудности достижения семантического соответствия в переводе. Гипонимия организует техническую лексику в таксономические цепочки, в которых гиперним охватывает класс более конкретных терминов — гипонимов; переводческая задача состоит не только в подборе формальных эквивалентов, но и в воспроизведении корректного уровня специфичности. На материале двуязычной документации

АО «Ўзбекистон темир йўллари», многоязычных терминологических ресурсов МСЖ и сравнительного корпуса английских и узбекских технических текстов выявляются три основные переводческие проблемы, обусловленные гипонимической асимметрией: сдвиг гиперним — гипоним; случаи лексической лакуны; и таксономическое расхождение, при котором классификационные структуры двух языков не соответствуют друг другу вследствие различных инженерных традиций. Каждый тип проблем иллюстрируется документированными примерами из области тяговых систем, путевого хозяйства, сигнализации и подвижного состава.

***Ключевые слова:** железнодорожная терминология, гипонимия, гиперним, семантическое соответствие, английско-узбекский перевод, терминологическая иерархия, лексическая лакуна, таксономическое расхождение, технический перевод, узбекский профессиональный язык.*

Introduction. Semantic correspondence in technical translation is not simply a matter of matching terms: it requires that the translated term occupy the same position in the target-language conceptual hierarchy as the source term occupies in the source language. This positional requirement is the domain of hyponymy — the paradigmatic relation of inclusion in which a specific term (hyponym) is a subtype of a more general term (hypernym). A translator who renders a hypernym with a hyponym, or vice versa, produces a text that is formally acceptable but semantically displaced: it commits the reader to a level of specificity — or a degree of generality — that the source author did not intend.

Railway terminology is organised to a considerable degree through hyponymic hierarchies. The domain distinguishes systematically between traction types, track configurations, signal system categories, vehicle classes, and infrastructure grades — each of which generates taxonomic trees with multiple levels. When translating between English and Uzbek, these hierarchies create three recurring problems. First, the two languages may have lexicalised the same conceptual space at different levels of the hierarchy, so that a source-language hypernym corresponds to a target-language hyponym or vice versa. Second, one language may have a dedicated term at a given level while the other has only a paraphrase or a borrowed form that blurs the hierarchical boundary. Third, the hierarchies themselves may be structured differently — reflecting different engineering traditions, classification standards, or historical development paths — so that the conceptual tree in English and the conceptual tree in Uzbek do not simply map onto each other level by level.

This paper analyses each of these three problem types using documented examples from English and Uzbek railway technical texts. The analysis is organised around the following research questions: (1) Where do hyponymic hierarchies in English and Uzbek railway terminology align, and where do they diverge? (2) What translation problems does each type of divergence generate, and how severe are the semantic consequences? (3) What translation strategies best preserve semantic correspondence when hyponymic structures are asymmetric between the two languages?

Literature review. The semantic relation of hyponymy was formalised for general linguistics by Lyons [1], who distinguished it from other sense relations — synonymy,

antonymy, meronymy — and identified its role in structuring lexical fields. Cruse [2] extended this analysis to show that hyponymy operates at multiple levels of granularity and that the same term can simultaneously be a hypernym relative to more specific terms and a hyponym relative to more general ones — a property he called the 'rank' of a lexical item. Applied to technical terminology, Sager [3] observed that domain-specific taxonomies are among the most stable and explicitly organised structures in specialised lexicons, precisely because technical communication requires reliable identification of entity types at controlled levels of specificity.

The translation implications of hyponymic asymmetry have been most systematically discussed under the heading of 'terminological non-equivalence' or 'lexical gap'. Vinay and Darbelnet [4], in their classical account of translation procedures, identified 'modulation' — a shift in the point of view or level of abstraction — as a common technique for handling cases where source and target lexicons organise the same conceptual space differently. More recently, Aixelà [5] discussed lexical gaps in terms of 'culture-specific items' requiring compensatory translation strategies, and while his treatment focused on cultural rather than technical vocabulary, the formal structure of the problem is identical: a concept exists in the source language at a level of specificity for which the target language provides no exact terminological match.

Research on hyponymic asymmetry in Uzbek technical translation is at an early stage. Xolmatov [6] noted the tendency of Soviet-era Russian railway terminology to lexicalise distinctions at a finer grain than Uzbek equivalents, attributing this to the greater technical elaboration of the Russian railway engineering tradition — a legacy of the Soviet period when Uzbek-language technical documentation was secondary to Russian-language sources. Nazarov [7] identified several cases of hypernym-hyponym mismatch in Uzbek transport terminology, but without systematic classification or analysis of translation strategy. The present study builds on these observations and extends them through corpus-based analysis.

The material base consists of: (a) bilingual Uzbek-Russian technical glossaries and maintenance manuals published by Uzbekistan Railways [8]; (b) UIC multilingual terminology compilations covering English, French, German, and Russian railway terms [9]; (c) ISO and EN standards governing railway terminology in English [10]; and (d) a comparative corpus of approximately 42,000 words of Uzbek-English technical translation from Uzbekistan Railways operational and procurement documents. Hyponymic sets were reconstructed for selected domains — traction systems, track infrastructure, rolling stock classification, and signalling — by mapping terms in each language against the UIC conceptual hierarchy, then comparing the level at which each language lexicalised each node.

Methodology. This study uses a corpus-based and comparative linguistic approach to examine hyponymic relations in technical translation. The main methods include semantic

analysis, terminological classification, and contrastive analysis. The material consists of Uzbek–Russian technical glossaries, UIC terminology databases, ISO/EN standards, and a 42,000-word Uzbek–English technical translation corpus from Uzbekistan Railways documents. Hyponymic relations were mapped according to the UIC conceptual hierarchy and compared across languages in key technical domains such as traction systems, infrastructure, rolling stock, and signalling. This approach helps identify terminological mismatches and analyze hyponymic asymmetry in technical translation.

Analysis and Results. The comparative analysis identified 28 cases of hyponymic asymmetry distributed across the four domains examined. These were classified into the three problem types described below.

The first type — hypernym-to-hyponym shift — arises when a source-language term occupies a higher node in the conceptual hierarchy than the closest available target-language equivalent. The railway traction domain provides a clear illustration. English 'traction unit' is a broad hypernym covering any powered vehicle used for traction purposes, including steam, diesel, electric, and multi-unit configurations. When translating 'traction unit' into Uzbek, the available terms are *lokomotiv* (which carries connotations of single-unit, conventionally powered traction) and *elektrovoz / teplovoz* (which specify electric and diesel traction respectively). None of these is a direct hypernym equivalent: *lokomotiv* is narrower in connotation, while *elektrovoz* and *teplovoz* are narrower in denotation. The translator must either use *lokomotiv* and accept a slight downward shift in generality, or insert a parenthetical specification — 'tortuvchi birlik (*lokomotiv yoki boshqa traksion vosita*)' — that restores the hypernymic scope at the cost of concision.

The reverse shift — hyponym-to-hypernym — occurs when the target language lacks a dedicated term at the specific level occupied by the source term. In the domain of track infrastructure, English distinguishes between 'ballasted track' and 'ballastless track' (also called 'slab track' or 'direct fixation track') as co-hyponyms under the hypernym 'permanent way'. Uzbek railway documentation uses *shag'al yo'l* (ballasted track) reliably, but dedicated single-word or compound terms for ballastless track at the same level of specificity are not yet standardised; documents use descriptive paraphrases such as *shag'alsiz yo'l konstruktsiyasi* (ballastless track construction) or *monolit beton yo'l* (monolithic concrete track). These paraphrases convey the referent but do not constitute terminological equivalents at the same hierarchical level: they are ad hoc descriptions rather than lexicalised hyponyms. A translator rendering an English specification that uses 'ballastless track' as a consistent technical term must choose between adopting a paraphrase — and thereby flagging the absence of a standardised Uzbek equivalent — or selecting the closest available form and annotating it.

Table 1. Hyponymic hierarchy: track type in English and Uzbek

| Level | English term | Uzbek term | Status |
|-------|--------------|------------|--------|
|-------|--------------|------------|--------|

| | | | |
|------------|-----------------------|--------------------------------|----------------------|
| Hypernym | permanent way / track | yo‘l / temir yo‘l inshootlari | Full equivalent |
| Hyponym L1 | ballasted track | shag‘al yo‘l | Full equivalent |
| Hyponym L1 | ballastless track | shag‘alsiz yo‘l konstruksiyasi | Paraphrase only |
| Hyponym L2 | concrete slab track | beton plitali yo‘l | Partial — borrowed |
| Hyponym L2 | asphalt track | asfalt yo‘l | Attested in UIC docs |

The second type — lexical gap — is structurally related to the hyponym-to-hypernym shift but deserves separate treatment because the source-language term has no equivalent at any level in the target language: the concept is present in the railway engineering practice but has not been lexicalised as a distinct term in Uzbek. The signalling domain yields the clearest examples. English railway signalling distinguishes a rich set of hyponyms under the hypernym ‘interlocking’: ‘mechanical interlocking’, ‘electromechanical interlocking’, ‘relay interlocking’, ‘electronic interlocking’, and — in contemporary high-speed rail — ‘computer-based interlocking’. The Uzbek term o‘zaro blokirovirovka (or the abbreviated Russian-origin blokirovka) covers the hypernym adequately, but the lower-level distinctions are only partially lexicalised. ‘Electronic interlocking’ and ‘computer-based interlocking’ in particular lack standardised Uzbek one-word or compound equivalents; translated documents from Uzbekistan Railways use descriptive constructions or retain the English or Russian terms in parentheses.

Lexical gaps of this type reflect not a failure of translation but a stage in the development of the Uzbek technical lexicon. As Uzbekistan Railways implements European Train Control System (ETCS) standards and integrates more closely with UIC frameworks, the technical vocabulary for contemporary signalling systems is being actively developed. The translation challenge in the interim is to handle these gaps consistently — using a standardised paraphrase, a borrowed term, or a glossary-annotated neologism — rather than producing ad hoc variation across documents. The three strategies each carry trade-offs: paraphrase is communicatively clear but terminographically unstable; borrowing is stable but may not align with Uzbek language-policy preferences; neologism is policy-consistent but requires institutional endorsement before it can function as a term.

Table 2. Hyponymic hierarchy: interlocking types in English and Uzbek

| Level | English term | Uzbek equivalent | Gap status |
|------------|-----------------------------|--|--------------------|
| Hypernym | interlocking | o‘zaro blokirovirovka / blokirovirovka | Full equivalent |
| Hyponym L1 | mechanical interlocking | mexanik blokirovirovka | Attested |
| Hyponym L1 | relay interlocking | rele blokirovirovkasi | Attested |
| Hyponym L1 | electronic interlocking | elektron blokirovirovka | Partial (borrowed) |
| Hyponym L1 | computer-based interlocking | kompyuter boshqaruvdagi blokirovirovka | Paraphrase only |

The third type — taxonomy divergence — is the most structurally challenging because it cannot be resolved by lexical substitution or paraphrase alone: the classificatory systems in the two languages are organised along different principles, so that a term in the source hierarchy belongs to a different conceptual branch from its closest formal equivalent in the target hierarchy. The rolling stock domain illustrates this most clearly. British English railway classification distinguishes rolling stock primarily by traction and service type: 'locomotive', 'multiple unit' (further divided into 'electric multiple unit' (EMU), 'diesel multiple unit' (DMU), 'diesel-electric multiple unit' (DEMU)), 'coaching stock', 'freight wagon'. Uzbek classification, inherited from the Soviet system, is organised primarily around power source and then function: *elektrovoz*, *teplovoz*, *avtoelektrovoz*, *elektroseksiya*, *passajir vagoni*, *yuk vagoni*. These two hierarchies overlap but do not coincide. 'Multiple unit' in English groups vehicles by their distributed-traction architecture, regardless of power source; the Soviet/Uzbek classification cuts across this at the power-source level. An English 'electric multiple unit' maps partially onto *elektroseksiya* but not fully, since *elektroseksiya* in Soviet-era usage referred to specific equipment configurations that do not cover all EMU types operated by Uzbekistan Railways today.

Taxonomy divergence of this kind requires the translator to make a meta-level decision: whether to follow the source-language hierarchy (producing Uzbek text organised around the British classification) or the target-language hierarchy (reorganising the content into the Uzbek classification scheme). For documentary translation — where the source document structure must be preserved — the first approach is usually required, but it means producing Uzbek text with a hierarchical organisation that Uzbek railway engineers may not immediately recognise as natural. For terminographic work — producing a Uzbek glossary that aligns with international standards — the second approach may be preferable, but it requires explicit mapping notes that show how the two taxonomies relate.

Across all three problem types, the most consistently effective translation strategy is what may be called 'level-marked equivalence': the translator selects the closest available target-language term and appends a parenthetical or footnote marking the hierarchical displacement — indicating whether the chosen target term is broader, narrower, or taxonomically misaligned relative to the source term. This approach is more labour-intensive than bare substitution but produces translations that are both communicatively functional and terminographically honest, preserving the information needed for a subject-matter expert to evaluate the correspondence.

Conclusion. This study demonstrates that hyponymic asymmetry between English and Uzbek railway terminology generates three structurally distinct translation problems — hypernym-to-hyponym shift, lexical gap, and taxonomy divergence — each requiring a different analytical response and a different set of translation strategies. The common

thread across all three is that semantic correspondence in technical translation cannot be reduced to formal equivalence: it requires attention to the position of the translated term within the conceptual hierarchy of the target language.

For translation practice, the most immediate implication is the need for hierarchically structured bilingual glossaries that indicate not only the term equivalent but its level in the relevant taxonomy — and flag cases where the levels do not match. Existing bilingual railway glossaries in Uzbek, including the official Uzbekistan Railways reference [8], present terms in alphabetical order without taxonomic annotation, making it difficult for translators to assess whether a proposed equivalent occupies the correct hierarchical position. A taxonomy-aware glossary, structured around the UIC conceptual framework, would substantially reduce the incidence of all three problem types identified here. Future research should address the specific domain of high-speed rail and ETCS signalling terminology, where the gap between international English-language standards and Uzbek technical vocabulary is currently widest and where the consequences of semantic displacement are most operationally consequential.

References:

1. Lyons J. Semantics. Vol. 1. – Cambridge: Cambridge University Press, 1977. – 371 p.
2. Cruse D.A. Lexical Semantics. – Cambridge: Cambridge University Press, 1986. – 310 p.
3. Sager J.C. A Practical Course in Terminology Processing. – Amsterdam: John Benjamins, 1990. – 257 p.
4. Vinay J.-P., Darbelnet J. Comparative Stylistics of French and English: A Methodology for Translation / transl. J.C. Sager, M.-J. Hamel. – Amsterdam: John Benjamins, 1995. – 359 p.
5. Aixelà J.F. Culture-Specific Items in Translation // Translation, Power, Subversion / ed. R. Álvarez, M.C.-Á. Vidal. – Clevedon: Multilingual Matters, 1996. – P. 52–78.
6. Xolmatov A.T. O‘zbek texnik terminologiyasida ruscha o‘zlashmalar va ularning o‘rnini bosuvchi milliy terminlar [Russian borrowings in Uzbek technical terminology and their national replacements]. – Toshkent: O‘zbekiston Milliy Ensiklopediyasi, 2014. – 168 b.
7. Nazarov B.R. O‘zbek transport terminologiyasidagi dubletlar: leksikografik tavsif [Doublets in Uzbek transport terminology: a lexicographic description] // O‘zbek tili va adabiyoti. – 2019. – № 4. – B. 45–53.
8. O‘zbekiston Temir Yo‘llari. Ikki tilli texnik lug‘at: o‘zbek-rus / Uzbekiston Temir Yo‘llari texnik terminologiya qo‘mitasi. – Toshkent: OAJ UTY, 2021. – 312 b.
9. International Union of Railways (UIC). UIC Multilingual Railway Terminology Database. – Paris: UIC, 2023. – URL: <https://www.uic.org/support-activities/it/article/uic-multilingual-railway-terminology> (accessed: 14.04.2025).
10. British Standards Institution. BS EN 50129: Railway Applications — Communication, Signalling and Processing Systems. – London: BSI, 2018.