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Creation of a termbase in the field of railway engineering: a terminological project in the context of WIPO Pearl.

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Abstract

The present dissertation is the result of a project in collaboration with the World Intellectual Property Organization (WIPO), which consisted in the creation of 30 terminological records pertaining to the domain of railway engineering in English, Italian, and Russian for the terminology portal WIPO Pearl. The objective of the project is to put into practice the skills acquired during the Information Mining and Terminology course by creating terminological resources that will contribute to the standardization of rail terminology across languages and help intellectual property professionals, policymakers, researchers, and the general public in navigating complex concepts. The dissertation consists of three chapters. The first chapter provides an overview of the main theoretical aspects of terminology and terminographical work with a focus on their characteristics. The second chapter provides a presentation of WIPO and its platforms PATENTSCOPE and WIPO Pearl, and describes the workflow carried out in the project, from the compilation of the corpus to the creation of the final terminological records on Multiterm Online. The third chapter delves into the challenges in complying with the guidelines during the project, the problem of differences in rail terminology according to English varieties, and issues pertaining to the creation of the Italian term entries. The final conceptual maps and terminological records are to be found in the appendix.

Contents

Introduction

The present dissertation is the result of a project in collaboration with the World Intellectual Property Organization (WIPO) consisting in the creation of 30 terminology entries for the WIPO Pearl terminology portal in the field of railway engineering. The project was carried out in English, Italian and Russian.

The aim of this project is to create terminological resources that will contribute to the standardization of rail terminology across languages and help intellectual property professionals, policymakers, researchers, and translators navigate complex concepts. In the process of creating the terminology records, I will put into practice the skills I acquired in the Information Mining and Terminology course. I will also gain insight into terminology work that is carried out by meeting deadlines, conducting thorough research on the domain, and adhering to the guidelines provided by the organization to ensure high-quality results.

This paper is divided into three chapters. Chapter 1 explores the historical evolution of terminology from its roots in the 18th century to modern developments, emphasizing the role of technological advancements and scientists like Eugen Wüster in the growing interest in this field. It then discusses the interdisciplinary nature of terminology, introducing the concept of *special language* and outlining differences between terms and general words. The chapter also compares terminography, the applied branch of terminology, with lexicography and describes the stages of systematic and ad-hoc terminology management. Shifting to patents and intellectual property, the chapter defines intellectual property and patents, and introduces the special language used in patent documents, highlighting its distinct classes of terminology.

Chapter 2 provides a presentation of WIPO and its goal of protecting intellectual property, as well as an explanation of the process of registering international patents through the Patent Cooperation Treaty (PCT). Furthermore, this chapter offers insights into the PATENTSCOPE patent database and the WIPO Pearl terminology platform. It covers the preparatory aspects of the terminological work, namely the choice of domain, an overview of the WIPO-PCT Terminology Course on Moodle, and a description of the guidelines. Finally, the chapter provides a detailed description of the workflow, which begins with compiling the corpus and selecting the English candidate terms, as well as the Italian and Russian equivalents, and concludes with creating the final terminological records and conceptual maps. The feedback provided by WIPO is also included in the final section of the chapter.

Chapter 3 begins by describing the feedback that WIPO provided with regard to the terminological records submitted. The chapter addresses the challenges encountered during the project, and the solutions adopted, as well as the errors committed

in the terminological records and the description of the mistakes provided by WIPO. Here, I explain the issues with finding contexts and sources that complied with the guidelines and the differences in rail terminology in American and British English, addressing how the International Union of Railways attempted to standardize terminology and how this problem has been addressed in the project. Finally, I discuss the issues pertaining Italian language when it came to selecting equivalents and contexts, such as the lack of Italian sources that complied with the guidelines, inconsistency and generality in Italian rail terminology, and absence of Italian equivalents for some terms.

The final conceptual maps, organized by subject subfield and language, can be found in the appendix. The appendix also contains the final terminological records, ordered by entry number.

1 An overview of terminology and terminology management

This first chapter focuses on the core principles of terminology and terminology management, providing the framework to establish a basis for subsequent discussions in this dissertation. Section 1.1 chronicles the historical development of terminology starting in the 18th century when scientists began to influence scientific nomenclature until the 20th century, which involved practitioners, engineers, and various international standardization organizations. Section 1.2 delves into the multifaceted nature of the term *terminology*, identifying its three key aspects and differentiating between special language and general language. In Section 1.3, the relationship between terminology, terms, and concepts is discussed, with an emphasis on their definitions. Section 1.4 offers an overview of the terminographical process, which includes collecting texts, extracting terms, and creating terminological records and conceptual systems. Lastly, Section 1.5 explores the concept of intellectual property and the purpose of patents, emphasizing the role of the special language used in patents in redacting these documents.

1.1 Brief history of terminology

Terminology has a relatively brief history. In the 18th century, scholars like Lavoisier and Berthollet in chemistry, as well as Linné in botany and zoology, demonstrated the enduring interest that the naming of scientific concepts held for those at the forefront of their respective fields. With the growing internationalization of science in the 19th century, the necessity for scientists to establish rules for systematically establishing terms within their disciplines became evident. International scientific and technical discourse was starting to take place, and as science and technology advanced and became more widespread, the demand for specific terms grew. Despite the increasing complexity, the use of technology helped to standardize and simplify the language used to describe these advancements, creating a more consistent and shared vocabulary among different communities (Rey 1995, 20; Cabré 1999, 10).

In the 18th and 19th centuries, scientists played a central role in developing and defining terminology related to their respective fields of study. This period saw the rapid expansion of scientific knowledge, and scientists were at the forefront of creating specialized vocabulary to describe their discoveries and theories. They were essentially the driving force behind the emergence of technical vocabulary during this era.

However, during the early 20th century, there was a noticeable shift as technicians and engineers became increasingly influential in shaping terminology. With

the rapid advancements in technology, professionals in these fields made significant contributions to the development of specialized terminology, taking a more active role in defining language specific to their areas of expertise. New concepts required naming and terms to be used also needed to be agreed upon by specialists in their fields. As a consequence, the first international standardization body, the International Electrotechnical Commission (IEC), was established in Missouri in 1904 to promote more homogeneity in vocabulary.

A pivotal role in shaping terminology later was also played by Eugen Wüster, the father of modern terminology and the main representative of the Vienna School, who had an engineering background (Cabré 1999, 5). In 1931, Wüster presented arguments for systematizing working methods in terminology in his doctoral dissertation called *International Standardization of Technical Language* (Wüster 1931). Wüster attempted to make it easier to organize and document technical vocabularies. He believed that vocabularies should be organized in a systematic or structured way. To achieve this, he proposed using a concept-oriented approach that helps to illustrate how different elements of the vocabulary are related to each other. In short, he wanted to create a practical method for categorizing and describing subject-specific words and concepts (Wüster 1972).

The 1950s saw a growth of interest in terminology theory, although the field was still neglected by linguists. In the 1960s-1970s, the development of mainframe computers and documentation techniques facilitated the advance in terminology. The first approaches to terminology standardization were made thanks to the arrival of databanks and the beginning of the international coordination of principles of terminology processing. Cabré (1999, 6) places the boom of terminology between 1975 and 1985, with the proliferation of language planning and terminology projects.

She also notes how the progress in computer science in the 1980s played a pivotal role in advancing terminology. It provided terminology professionals with an array of new tools and resources that were not only better suited to their requirements but also more user-friendly and highly efficient. Furthermore, the emergence of the language industry market in that same period had a significant impact. With a growing number of agencies and countries expressing keen interest in international cooperation, this development further propelled this field.

Such advancements in terminology arose in response to other changes as well, including the rapid progress in science and technology, the proliferation of new concepts and fields, the unprecedented accessibility to vast amounts of information, and the growth of mass communication enabling the widespread dissemination of terminology. The resulting interplay between general and specialized lexicons contributed to the heightened importance of terminology in our evolving society (ibid., 4).

1.2 Definition of terminology

As both Sager (1990, 3) and Cabré (1999, 32) point out, the word *terminology* refers to at least three different concepts: the principle and concepts that regulate the study of terms, the guidelines used in terminographical work and the set of terms of a given special subject. For this reason, as Sager (1990) notes, it is not easy to provide a single formal definition of terminology, although such a process is necessary since terminology deals with concepts, their definitions, and names. He proceeds to define it as

> the study of and the field of activity concerned with the collection, description, processing and presentation of terms, i.e. lexical items belonging to specialised areas of usage of one or more languages. (2)

This definition is similar to one of the definitions provided by Cabré (1999), according to whom

> terminology is an interdisciplinary field of inquiry whose prime object of study are the specialized words occurring in natural language which belong to specific domains of usage. (32)

In this definition of terminology, however, she stresses the interdisciplinary nature of terminology, which includes both theoretical principles and practical applications, including the creation of vocabularies, glossaries, and dictionaries, and the standardization of terms. The theoretical concepts within terminology are borrowed from related disciplines such as linguistics, logic, ontology, and computer science. At the same time, terminology may be considered a part of linguistics, since terms are a subcomponent of a language's lexicon. It is, therefore, a part of applied linguistics that concerns the practical use of specialized vocabulary.

It results that terminology concerns language used for communicating specialized knowledge and information within a specific field; this language is referred to as *special language* or *language for specific purposes* (LSP). According to ISO 1087:2019, a special language is "natural language used in interactions among domain experts, characterized by the use of specific linguistic expressions and communication methods." These linguistic codes share several features with the general language, which, on the other hand, is "natural language characterized by the use of linguistic means of expression independent of any specific domain." (ISO 1087:2019) In fact, special languages can be considered variants of general language, each having unique sets of characteristics that change according to subject field, type of interlocutors, communicative situation, speakers' intentions, the context in which the exchange occurs, the type of exchange, etc. (Cabré 1999, 59). For example, the special language used

by a physics professor lecturing to undergraduate students will differ significantly from the language employed by a scholar presenting at a conference to a specialized audience in the field of chemistry. Each special language concerns itself primarily with *terms*, or *terminological units*.

Terms significantly differ from words intended as lexical items, as explained by Kageura (2015, 48). The former, for example, possess characteristics and meanings that are closely connected to the field or subject area they belong to, which is something that does not apply to lexical units. Words also include both functional elements, such as prepositions and conjunctions, and content-bearing items, such as *cat*, *tree*, *laptop*; on the other hand, terms consist of content-bearing items only since they represent concepts inside a domain. From a part-of-speech point of view, terminology mostly comprehends nouns, although verbs, adverbs, and adjectives can sometimes be considered terms when used in a specific domain. Additionally, most terms are *complex terms*, i.e. formed by multiple words, while *simple terms*, i.e. terms constituted by one word, are in the minority. Finally, while in general language many words are polysemous and synonymous, terms in specialized fields tend to have fewer polysemous or synonymous variations. This is because domain-specific terminology is carefully curated to reduce confusion and ensure that a term has a single, precise interpretation.

Recognizing these distinctive features and variations among terms and words is imperative when developing a terminological resource. It allows to distinguish terms from words commonly found in general language and facilitates the process of associating terms with their intended concepts. Selecting the right term for a concept is known as an *onomasiological* process, and it sets terminography apart from lexicography, where the reverse approach, referred to as *semasiological*, is more commonly employed (Cabré 1999, 8). As a matter of fact, semasiology concentrates on the study of meanings and how they change within a language and therefore characterizes the lexicographical approach. On the contrary, onomasiology deals with the study of concepts or ideas and how speakers or language users express these concepts through language (Rey 1995, 127; Santos and Costa 2015, 156–157) Terminologists adopt the onomasiological approach because their primary concern lies in comprehending the concept and the intricate relationship between terms and concepts rather than providing linguistic descriptions of terminological units.

1.3 The relations between terms and concepts

As stated in Section 1.2, terminology focuses on terms and the concepts they define. In the ISO 704:2000 recommendation, *concepts* are defined as "mental constructs or units of thought [...] which are represented in various forms of communication."

These concepts are established by categorizing individual objects through a cognitive process known as *conceptualization*. From a terminological point of view, the International Standard also defines *concepts* as "mental representations of objects within a specialized context or field." According to Dubuc and Lauriston (1997), an *object* is "anything that can be conceptualized." (80) These objects can be things and events, but also properties and relations (Nedobity 1983, 70).

These definitions allow us to draw a clear line between concepts and the objects in the real world they represent. From this point of view, concepts do not refer to the object themselves, but rather to a set of characteristics that define a class of objects and are expressed through its paraphrase or definition. Nedobity (1983, 70), Meyer et al. (1997, 101), and Cabré (1999, 99) explain how a set of characteristics represents one's knowledge about a concept and provide a definition of *intension* and *extension*. The former is the sum of all the characteristics of a concept, whereas the latter refers to the collection of objects to which a concept refers. A concept has a broad or narrow intension according to the number of characteristics it has. The names and values of characteristics can be concepts as well and often denote specialized concepts in a particular subject field. They may refer to general concepts when used in general language but become specialized terms that should have terminological descriptions of their own when they occur in a specific subject field (Meyer et al. 1997, 101–102). The concept of *velocity* is an example of how a concept can have different levels of intension. In the broad sense, velocity represents the speed and direction of motion of an object and is widely understood in everyday language. However, when entering a specialized field, the concept of *velocity* becomes more specific. In physics, for instance, velocity is a narrow concept with additional properties. It includes the parameters of magnitude and direction and is described in a highly specialized manner. In this context, *velocity* is a specialized term with its own unique terminological description.

Terms and concepts are linked together by definitions. Sager (1990) divides general definitions, which describe a concept in a comprehensible way, from specialized terminological definitions. According to him, a terminological definition "provides a unique identification of a concept only concerning the conceptual system of which it forms part and classifies the concept within that system." (39) The difference between general and terminological definitions lies in how terms are understood. In natural language, terms can often be comprehended through the context and sense relations they have in discourse, allowing for more flexible interpretations. In terminology theory, however, specialized terms have fixed and specific referential meanings within their area of usage, eliminating ambiguity and ensuring precision.

1.4 Terminography and terminology management

As previously stated in Section 1.2, terminology can be defined as the study of and the field of activity concerned with the collection, description, processing, and presentation of terms. The applied branch of terminology, i.e. "terminology work aimed at creating and maintaining terminology resources," (ISO 1087:2019) is known as terminography. Terminography is often compared to lexicography, the applied branch of lexicology, since their output takes the form of collections of lexical or terminological units; however, the two differ significantly from one another. As explained in Section 1.2, the working procedure in lexicography is semasiological as the lexicographer first establishes a list of words that constitute the entries of the dictionary and proceeds to describe them semantically employing definitions, whereas terminography follows an onomasiological approach (De Bessé 1997, 64; Cabré 1999, 8; Kageura 2015, 53). In fact, terminologists first create a list of concepts within a given field. These concepts are logically and ontologically related to each other and form the entire conceptual system of a particular discipline or activity. Each concept is then assigned a specific designation, which is the term specialists commonly use when referring to it. If there are multiple designations for one concept, either one is selected and the others discarded or more than one is accepted, but one form is prioritized over the others. Additionally, terminological lists discard words pertaining to general language only and contain terms that belong to a specific subject field. This is because terminology is based solely on specialized documents that form a corpus, a collection of texts (see Section 1.4.1). The selection of texts and the methodology for collecting and analyzing them are determined by the specific requirements of each terminology task.

As a matter of fact, every terminology task comes with its set of objectives and characteristics that set it apart from other tasks, and this differentiation begins with terminological search. Cabré (1999, 129) distinguishes various types of terminological search according to two criteria. The first criterion is the number of languages involved in the search, which determines whether a search is monolingual or multilingual. The second criterion, on the other hand, determines whether the search is systematic or ad-hoc. Wright and Wright (1997, 148) outline the differences between systematic (subject-field-driven) and ad-hoc (text-driven) terminology management. Generally, in systematic terminology management, the terminologist must collect terms and concepts from a global field, construct one or more conceptual systems, provide a well-structured definition, and create term entries that must be linked to the conceptual system(s) so that they reflect the concept they design. These steps can be carried out in a systematic way since the terminologist has the time to do their research, select terminology, and organize concepts in a logical, structured way.

However, terminologists and translators who have to deal with random extracts from a domain, usually in a translation task, likely must comply with time constraints and do not need to cover the entire subject field. In this type of terminological work, searches are therefore limited to a single term or a small set of terms within a specific subject area or across different fields (Cabré 1999, 129). This is where ad-hoc terminology management comes in: in this context, the terminologist or translator must identify the terms, create starter entries, and document available contexts in the texts they own. Should they have the time, they can research greater context and construct a conceptual system based on available segments.

Cabré (1999, 131) identifies three main stages in systematic multilingual terminological search, which have been followed in the development of the task described in this dissertation. Firstly, one must define the domain to address, the final user, and the purpose of their work. The decisions made in this regard determine factors such as deadlines, allocation of material and financial resources, and planning of the specific steps to be taken. In other words, the approach to each task should be based on the practical constraints and requirements of the task's use case. After this stage, the terminologist acquires all information about the task and the framework in which the domain is located, chooses the consultants, establishes the corpus, draws up the conceptual structure of the field, and proposes a work schedule. Finally, the terminologist proceeds to extract the terms, include them in an extraction record with details such as the canonical form of the term, the context, the reference of the context source, etc., and create the terminological record, which normally includes the entry, the reference, the grammatical category, the definition or context and, in the case of multilingual tasks, equivalents in other languages.

It is important to note that not all of the steps described above will necessarily be followed for every task. The approach and requirements may vary depending on the specific nature of the task. Some terminology tasks may require a more comprehensive process that includes all of the steps, while others may require only a subset of these steps.

The following sections will focus on the corpus and term extraction components of terminological work, to lay out the foundations for the actual steps carried out in the framework of the WIPO project.

1.4.1 Corpus compilation

Once the topic, final user, and purpose of the task have been defined, the actual terminological search process begins. When seeking terms commonly used by specialists in the domain, the terminologist must investigate how these terms are employed in real documents related to the topic. This search involves the creation of a corpus.

In a general sense, a corpus is a collection of texts. However, within the area of

corpus linguistics, the term holds a more specific connotation. Bowker and Pearson (2002) define a corpus as "a large collection of authentic texts that have been gathered in electronic form according to a specific set of criteria." (17) This definition is crucial for distinguishing corpora from other types of text collections. Corpora are valuable tools not only for lexicographers, sociolinguists, and historical linguists but also for terminologists. Terminologists can rely on these text collections to acquire knowledge within their research field, identify terms and their attestations, recognize synonymous terms conveying the same concept, distinguish clues regarding meanings and relationships between terms, and identify collocates associated with a term (L'Homme 2020, 33–34). Corpora are particularly essential for terminological analysis, as they provide reliable contexts for a comprehensive understanding of terms and the acquisition of knowledge about a specific topic or domain, which terminologists often have limited familiarity with.

The process of compiling a corpus changes according to the scope of research. Bowker and Pearson (2002, 11–12) make a distinction between general reference corpora, which can be considered representative of a language as a whole, and special-purpose corpora, which focus on specific linguistic aspects. Corpora can also be categorized as monolingual or multilingual: monolingual corpora contain texts in a single language, while multilingual corpora comprise texts in two or more languages. Multilingual corpora are further divided into parallel and comparable. The former includes texts in one language along with their translations into one or more other languages, whereas the latter encompasses texts originally written in the language(s) of study that share certain features or characteristics. For instance, they might pertain to the same subject, belong to the same text genre, or be written during the same period. In the case of the project outlined in this dissertation, a monolingual corpus was assembled to extract potential candidate terms in English (see Section 2.3.1).

When it comes to terminological work, the corpus from which terms are extracted must meet specific criteria to ensure the reliability of the results. According to Cabré (1999, 134), the texts from which terms are extracted should represent the field being analyzed and possibly be written by highly reputable authors. They also must cover all aspects of the terminological task to be performed, be up-to-date in order for the terms obtained to be useful, and be originally written in the language in which the terminologist is conducting the task. After assembling the corpus, the terminologist can proceed with terminology extraction.

1.4.2 Terminology extraction

This step aims to identify the core vocabulary of a specialized domain, as explained by Heylen and De Hertog (2015, 203). Texts from the compiled corpus are ana-

lyzed and used for retrieving terms that will be later inserted in the termbase. The terminologist can decide to perform manual or automatic term extraction. In traditional manual term extraction, the terminologist lists potential candidate terms and consults with a domain expert to compile a final list of validated terms. However, manual extraction has been almost entirely replaced by automatic term extraction (ATE).

ATE is usually employed to create a list of candidate terms that will be used as a starting point for compiling the final lists of terms that will make it into the termbase. This is achieved by using specialized tools that can be either commercial or free, web-based or desktop-based. In general, term extractors compare words that occur in a special-purpose corpus (usually referred to as *focus corpus*) with words in a general reference corpus in the same language.

One of the web-based tools for corpus analysis is the SketchEngine platform,[1] which allows users to create their own corpora or use already existing ones available on the platform and perform automatic term extraction based on the selected texts. This software allows to extract both single and multi-word terms, and the Word Sketch feature processes the collocates and surrounding words of a given word to provide a one-page summary of its grammatical and collocational behavior. SketchEngine also provides OneClick Terms,[2] a free term extractor that allows the user to create bilingual glossaries on the basis of keywords found in parallel corpora. Both SketchEngine and OneClick Terms exploit the same statistical and linguistic term extraction methods and allow terminologists to immediately find keywords in texts of research.

Free alternatives to SketchEngine are also available, such as TermoStat[3] and AntConc.[4] The latter was developed by software engineer Lawrence Anthony and originally intended for use in a classroom context (Anthony et al. 2004) Like SketchEngine, AntConc provides a variety of features that help extract terms manually and can be used to find clusters, N-grams, and collocations as well. The *Clusters* Tool displays clusters according to the search condition, providing a summary of results obtained through the *Concordance* Tool or *Concordance Plot* Tool. In contrast, the *N-Grams* Tool searches the entire corpus for clusters of 'N' length (e.g. 1 word, 2 words, etc.), allowing users to identify common expressions throughout the corpus (Anthony 2023). The *Collocation* tool helps users find collocates, i.e. words that have a tendency to appear near a specific word more frequently than they do when paired with other words in the corpus (Baker et al. 2023). This serves as an indicator of the common associations between words and how they can be used in context.

1. Available at: https://www.sketchengine.eu/
2. Available at: https://terms.sketchengine.eu/
3. Available at: http://termostat.ling.umontreal.ca/index.php?lang=en_CA
4. Available at: https://www.laurenceanthony.net/software/antconc/

AntConc has been used to extract candidate terms from patents in the English language for the project. Section 2.3 will focus more on detail on the procedure followed to retrieve English terms and their equivalents into Italian and Russian.

1.4.3 Conceptual systems

Term entries usually include fields to specify relations with other terms in the termbase. This complex system of conceptual relations among terms can be visualized by means of conceptual systems and can cover several classes of concepts: objects, properties of said concepts, relationships, operations, etc. (Cabré 1999, 133). Most of the time, terms are represented in the singular, but plurals can be included as certain objects only occur in the plural number, and relations between terms can be illustrated by different types of diagrams (Wright 1997). Figures 1.1 and 1.2 show examples of a tree diagram and a bracket diagram representing general and partial relations between the broad concepts *car* and *computer hardware* and their components.

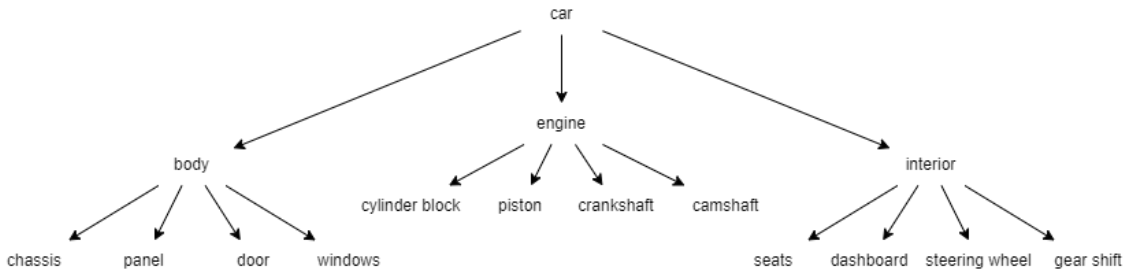


Figure 1.1. Tree diagram representing relations between *car* and its components.

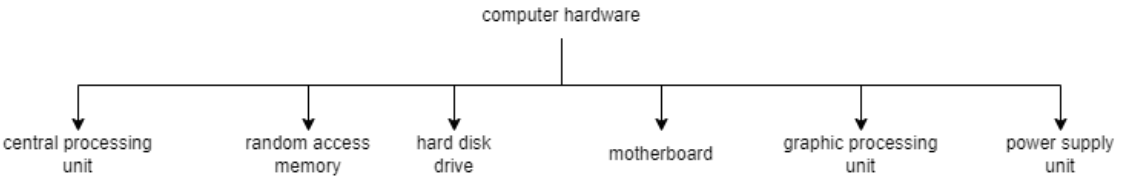


Figure 1.2. Bracket diagram representing relations between *computer hardware* and its components.

Different types of relations can be represented in conceptual systems. Sager (1990, 29) and L'Homme (2020, 145) dive into the different kinds of relations between concepts and terms underlying the conceptual structure. There are two fundamental types of conceptual relations in terminology: taxonomic and partitive relations. Taxonomic relations are hierarchical and often represented as tree structures. In this type of relation, generic concepts pass on all their characteristics to specific concepts, which differ from the generic concept by one or a few additional characteristics. The relation between a generic and specific concept is asymmetric. For example,

the term *greenhouse gas* (generic) includes specific concepts such as *carbon dioxide*, *methane*, and *water vapor*. Partitive relations, on the other hand, connect concepts that are spatially related or situated nearby. They involve a whole and one or more parts, without necessarily sharing characteristics as a prerequisite for such connections. Examples of partitive relationships include the connections between *car* (an entirety) and its separate components (parts).

Opposition relations are another type of conceptual relations that involves opposing characteristics and incompatibility between concepts. If specific concepts that fall under the same generic concept are seen as incompatible, it means that they are mutually exclusive. For example, within the domain of fruits, the generic concept *citrus fruit* includes specific concepts like *orange*, *lemon*, and *lime*. However, the relationship between these specific citrus fruits is incompatible: if something is classified as an *orange*, it cannot simultaneously be a *lemon* or a *lime*. Opposition relations are important but are typically not explicitly addressed in terminology work. It is important to note that not all cases of incompatibility involve opposition; in fact, incompatibility can arise due to the specific category or context.

Although generic and partitive relations represent the foundation of conceptual systems, associative relations may provide a more complex web of connections. According to Sager (1990, 34, 36), this type of non-hierarchical relations may be more revealing about the nature of the concepts. He lists several possible associative relationships: cause-effect (*explosion-fall-out*), material-product (*steel-girder*), activity-place (*coalmining-coalmine*), etc. Comprehending these relationships is pivotal in explaining how diverse phenomena are interconnected and their impact on specific domains.

L'Homme (2020) also identifies terminological relations, which "include relations between terms viewed as lexical units and the meaning they convey." (155) Paradigmatic relations establish connections between terms within the lexicon. Some examples of these relations are hypernymy, hyponymy, synonymy and antonymy. Hypernymy and hyponymy are crucial for comprehending the structure of the lexicon. They are hierarchical and asymmetric relations that maintain transitivity when multiple levels are identified. For instance, *fruit* is the broader category, i.e. hypernym that includes various specific types of fruits, such as *apple*, *orange*, *mango*, etc., which are its hyponyms. Synonymy, on the other hand, is a symmetric relationship between terms with identical or very similar meanings. Exact synonymy happens when two terms share all of their semantic components, such as *solvent* and *diluent*, which refer to substances used to dissolve other substances. While there are technical distinctions between them based on specific contexts and applications, in certain scenarios these terms can be considered synonymous as they both involve a substance used to dissolve or dilute another substance. On the contrary, antonymy

connects terms that share most of their semantic components but at least one of them introduces an opposition. This is the case of the verbs *download-upload*, which in the field of computing denote activities in which a file is moved from one location to another.

L'Homme (2020, 174–175) also describes syntagmatic relations, which entail how terms interact with other lexical units in sentences. There are two guiding principles that govern these interactions: syntactic rules and semantic affinities. Syntactic rules determine how nouns, verbs, adjectives, and adverbs can be combined with specific parts of speech to fulfill predefined syntactic functions. Additionally, terms can combine based on shared semantic connections; for instance, *abundant* pairs naturally with terms denoting living organisms but seems odd with locations or psychological dispositions. Although some combinations follow regular syntactic and semantic rules, others, known as collocations, have more nuanced constraints. Collocations are specific linguistic expressions where one word (the base) is freely chosen, while the second word (the collocate) must be used with the base to convey a precise meaning. These combinations, including expressions such as *write a program* or *develop an application*, occur frequently in both general and specialized language domains. Their usage does not always follow standard linguistic rules, but it depends heavily on customary usage within a particular field.

1.4.4 Terminological records

After extracting relevant terms from the corpus, the terminologist will finally compile the terminological records. According to Cabré (1999), "a terminological record is a structured guide that allows us to assign information about a term in an ordered fashion." (139) Some of the details that usually appear in the records are the entry, the reference and grammatical category of the term, the subject area to which the term belongs, the definition and/or context, the source of the context, and notes. If the task is multilingual, equivalents in other languages are to be added. This information should be presented according to a set of standardized conventions that allow users to easily retrieve the information and exchange it, especially when it comes to systematic terminological work.

Nowadays, termbases are created using specialized software. This software can either be integrated into computer-assisted translation (CAT) tools or exist as standalone applications like MultiTerm.[5] These applications allow terminologists and translators to efficiently share terminology by exchanging termbases in TermBase eXchange (TBX) file format, the ISO standard for terminology exchange (Melby 2015). This type of file not only serves as a valuable reference for consultation

5. Available at: https://www.trados.com/product/multiterm

but also acts as a helpful resource for maintaining terminological consistency across translations, especially in team projects.

1.5 *Patentese* language

Special languages concern different text types, especially those that are more uniform across different languages. For instance, international patenting has led to a patent structure and typology that are standardized across different countries and languages, giving rise to what Lawson (1997, 171) refers to as *patentese* language. But in order to grasp the language and terminology used in patents, it is crucial to first define the concept of intellectual property and the purpose of patenting.

1.5.1 Purpose of intellectual property and patents

Intellectual property (IP) refers to "creations of the mind – everything from works of art to inventions, computer programs to trademarks and other commercial signs." (World Intellectual Property Organization 2020) IP rights, such as copyright, patents, and trademarks, can be viewed as similar to traditional property rights. They provide creators and owners of IP with the means to benefit from their labor or investments in a creation by allowing them to control its use.

In relation to IP, a patent can be defined as "an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem." (World Intellectual Property Organization) In general, in order to obtain protection, an inventor or company must file an application with a patent office that describes the invention in sufficient detail to enable a person of ordinary skill in the art to use or reproduce the invention. Drawings, plans, and diagrams are often included in such descriptions. The application also contains a set of claims, which is used to determine the scope of protection to be afforded by the patent. Upon submission, the patent office evaluates the application to determine its eligibility for protection.

The purpose of patents is to protect the patentee's invention and the interests of its inventor by allowing them to control the commercial use of the invention, and the language used in the patent helps the inventor to effectively protect their invention.

1.5.2 Features of *patentese*

Patentese is a special language used to describe inventions in patent documents, ensuring legal protection, clarity, and precision in conveying the unique aspects and functionalities of an invention to the relevant authorities and stakeholders within the field of intellectual property. Applicants must carefully select every word that

constitutes their patents to prevent competitors from circumventing and using them with impunity.

Lawson (1997, 173–175) identifies five classes of terminology used in patents. Four of them are patent-specific, while the fifth is technical terminology. Patent-specific terminology includes *broad terms*, namely generic terms and other breadth enhancers. Lawson emphasizes how claiming a specific item (such as a screw) can allow competitors to easily circumvent the patent by substituting a similar item (such as a nail); therefore, using broader terms such as *fastener* can cover a wider range of items and methods, making it more difficult for competitors to find loopholes or alternatives. For this reason, generic terms are very common in patents, and almost any verb, noun, or adjective is potentially functional.

Applicants may use *precision enhancers* to modify the meaning of terms within the patent and ensure that the descriptions are precise and legally sound. These techniques include specific language structures like *the* or *said* to clarify references, the use of *known* to differentiate between established and new information, *which* to clarify antecedents, and *respective* to avoid ambiguity in descriptions.

Patentese also includes structure makers that signal the beginning of a section (*title of the invention*, *technical field*, *background art*) or words that occur very frequently in certain sections in order to help readers quickly locate their position within the intricate structure of a patent. In other words, these markers provide a quick glimpse into the content of different sections, aiding readers in scanning through the document to find relevant information or sections of interest.

Patent law terms (*patent*, *state of the art*, *claims*, *patentee*) are also very frequent. For example, the term *state of the art* denotes the present level of advancement, comprehension, and technology in a specific field at the moment of invention, and incorporates existing procedures, methods, goods, or technologies that are widely accessible and known to experts in that field. The importance of the state of the art in patent applications lies in showcasing the novelty and inventiveness of the proposed invention. This allows patent examiners to evaluate the invention's eligibility for patent protection by determining whether it is sufficiently distinguishable from existing technologies or methods.

Normal technical terminology is also widely used in invention descriptions and specifications, which are written in an impersonal way and usually in the present tense.

Such features have been encountered while searching for terminology in the English corpus as well as in Russian and Italian patents. Knowledge of these very frequent phrases and terms was extremely helpful in term context retrieval, as it made it easier to query definitions.

2 Terminology project within WIPO Pearl

This chapter serves as an overview of the project underlying this dissertation and the context in which it unfolds. Section 2.1 provides information about the World Intellectual Property Organization, its primary goal and role in stimulating creativity and innovation across various technical and scientific fields. It also highlights the importance of the Patent Cooperation Treaty in facilitating international cooperation and knowledge sharing in the realm of intellectual property, also thanks to platforms such as PATENTSCOPE and WIPO Pearl. Section 2.2 illustrates the preparation of the project before proceeding to the terminological research, such as the choice of the domain, the Moodle course, and the guidelines. Section 2.3 describes the project in detail, explaining the rationale behind decisions, and providing a step-by-step explanation of the workflow, from building the corpus and extracting the terms to creating the final terminological records and conceptual maps. moving on to the challenges encountered while working on the project in Chapter 3

2.1 Overview of WIPO, PATENTSCOPE and WIPO Pearl

2.1.1 World Intellectual Property Organization

The World Intellectual Property Organization (WIPO) is a specialized agency of the United Nations whose primary purpose is to promote the protection of intellectual property (IP) worldwide and to ensure administrative cooperation among IP organizations. Founded in 1967 with the signing of the Convention Establishing the World Intellectual Property Organization, it now has 193 member states, 26 international treaties and 54 technical standards. It is based in Geneva, Switzerland, and since October 1, 2020, its Director General is Daren Tang.

WIPO aims to develop a system of global IP consultation to stimulate creativity, innovation and inventiveness in fields including industry, literature, art and science. Thanks to its organizational structure divided into sectors and units, the agency can carry out a wide range of programs and activities related to IP.

The most prominent among the services offered is the preservation and protection of intellectual property. A key role in this area is played by the Patent Cooperation Treaty (PCT), the international treaty that governs cooperation among member states in the registration and protection of intellectual property. The PCT system allows the inventor to make a single, internationally recognized registration of his or her patent, thereby ensuring protection in all member states of WIPO. In addition, the PCT provides decision support to patent offices and facilitates public access to a wide range of technical information related to patents.

2.1.2 International patent registration process

The PCT registration system consists of two main phases, and is well explained in the official *PCT Applicant's Guide Introduction to the International Phase*[6] on the WIPO IP portal. The process begins with the submission of an international application and ends with the grant of national and/or regional patents if the outcome is favorable for the applicant. These phases are referred to as the *international phase* and *national phase*.

The international phase starts with the filing of an initial patent application in the applicant's home country or region, commonly known as the *priority application*, which sets the vital priority date for determining the invention's novelty. Next, the applicant creates a thorough explanation of the invention, accompanied by any necessary drawings or diagrams, to be included with the patent application. After the applicant has established the priority application, they may file an international PCT application through their national or regional patent office or directly with WIPO. This filing requires completion of the PCT application form, payment of fees, and submission of the invention description. Subsequently, an International Searching Authority (ISA) conducts an objective international search to identify potentially relevant prior art and assess the patentability of the applicant's invention. This process results in the creation of an international search report (ISR). The PCT application is then published 18 months after the filing date of the priority application, thereby making the details of the invention accessible to the public. Additionally, applicants have the option to request an international preliminary examination (IPE) from a designated International Preliminary Examining Authority (IPEA). This results in a preliminary examination report (IPER) that provides an opinion on the patentability of the invention.

During the national phase, the applicant must file patent applications separately in the precise countries or regions where they desire patent protection, adhering to the procedures and requirements of each national or regional patent office. Based on the respective patent laws and examination processes of each jurisdiction, these submitted applications undergo examination and further determinations. The applicant must adhere to the deadlines and requirements set by each national or regional office to ensure that the invention is examined for patentability and, if approved, granted protection in those particular territories. It is crucial to engage with certified patent experts who possess a thorough understanding of the patent laws and policies of the desired nations to effectively navigate the national phase.

On the day of the successful international PCT registration, the full text of the patent and related documents are published on the PATENTSCOPE online

6. Available at: https://pctlegal.wipo.int/eGuide/view-doc.xhtml?doc-code=pctip&doc-lang=en&doc-type=guide

database, allowing anyone to easily access patent documents and information.

2.1.3 The PATENTSCOPE database

The PATENTSCOPE database[7] is the database through which WIPO provides access to 113 million patent documents including 4.7 million published international patent applications at the time of writing. Thanks to this tool, users can easily query patents from all over the world and customize their search with operators and a wide range of criteria such as keywords, IPC, numbers, filing language etc. The search results screen then displays the resulting patent previews with their corresponding patent number, invention title, international class, application number, applicant and inventor names, and abstract. This information can be translated into all languages available on WIPO Pearl (see Section 2.1.4) using the *WIPO Translate* Machine Translation engine, and up to 10,000 results can be downloaded in Excel format.

Each patent has its own informative page which shows all relevant information about the application (Figure 2.1). From this screen, users can navigate between tabs to read the descriptions, as well as check drawings and additional documents.

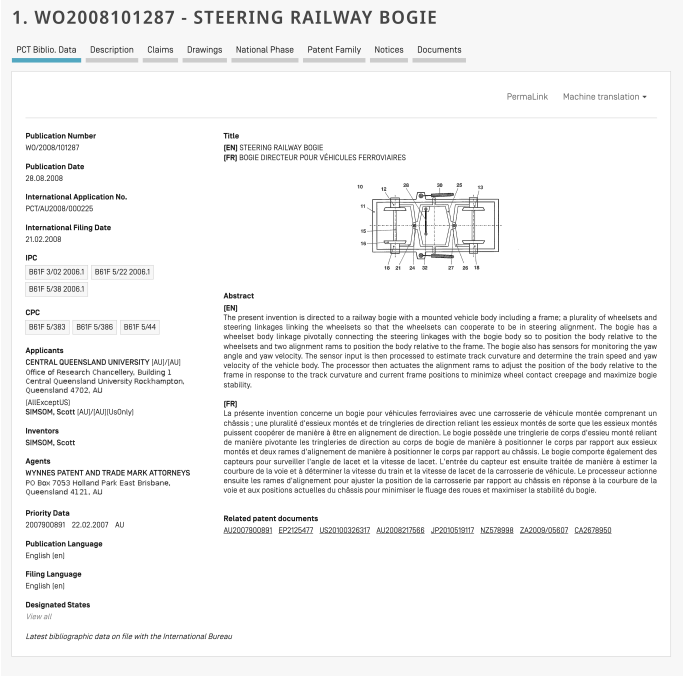


Figure 2.1. Full information sheet of a patent on PATENTSCOPE.

Patents are classified according to the International Patent Classification (IPC) established in 1971 by the Strasbourg Agreement, which offers a structured set of language-neutral symbols for categorizing patents and utility models according to their respective technological domains. The IPC classifies technology into eight

7. Available at: https://patentscope.wipo.int/

sections (A-H), featuring approximately 70,000 subdivisions. Each subdivision is identified by a symbol consisting of Arabic numerals and Latin alphabet letters (World Intellectual Property Organization). National or regional IP offices assign IPC symbols for patent documents, while the ISA assigns them for PCT documents. For example, the IPC symbol for an invention related to railway safety technology might be B61L, in which:

- B is the section that covers performing operations and transporting;
- B61 is the class that covers railways;
- B61L is the subclass that covers inventions for guiding railway traffic and ensuring the safety of railway traffic, namely devices along the route interacting with trains, signals, operation of points and signals, interlocking, block systems, and level crossings.

The IPC publication is accessible through an online portal.[8] Figure 2.2 shows the scheme of the Railway class and its subclasses.

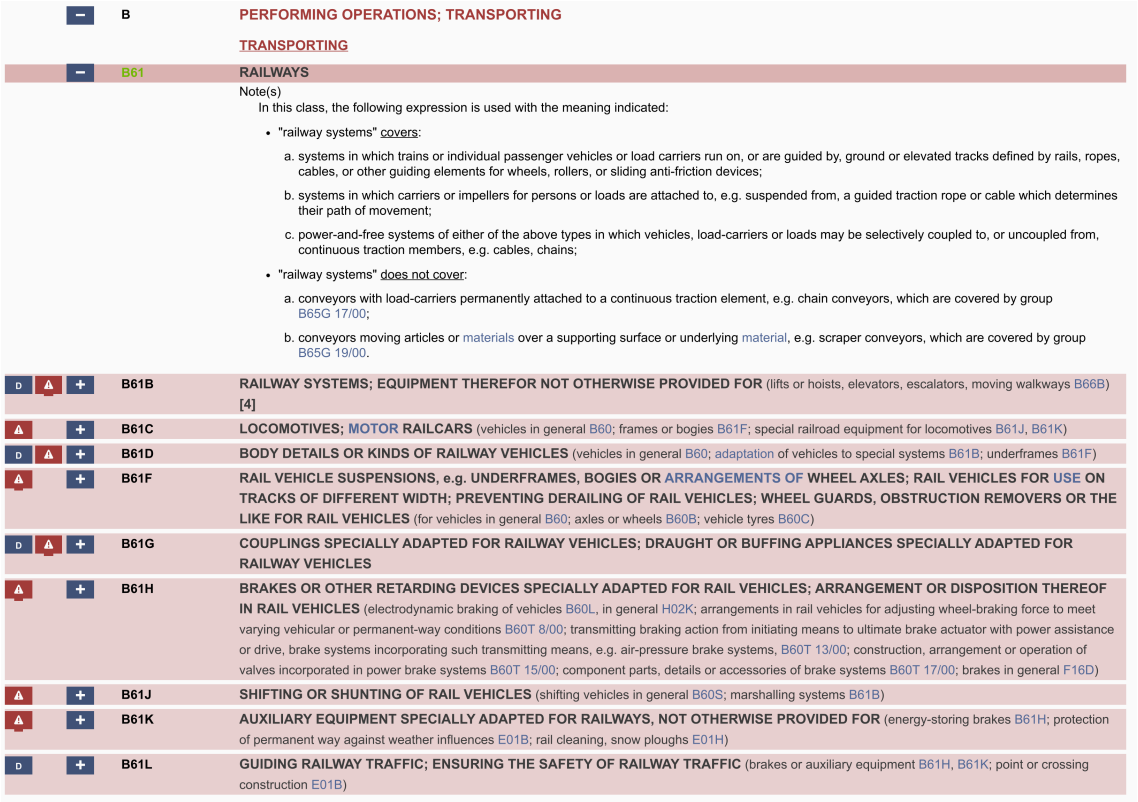


Figure 2.2. Structure of the B61 class and subclasses.

For this project, it was essential to possess knowledge of PATENTSCOPE features, advanced search options, and IPC classification to identify appropriate texts for the corpus and contexts for the terminological records.

8. Available at: https://ipcpub.wipo.int/

2.1.4 WIPO Pearl: WIPO's multilingual terminology portal

WIPO Pearl[9] is the portal through which users can access WIPO's multilingual terminology database of definitions and concepts related to technical and scientific terms used in the field of IP. It contains terms extracted by experts and terminologists from patent documents in PATENTSCOPE.

The platform offers a wide range of definitions in different languages to help industry professionals better understand the terminology used in the field of IP. This tool was created to promote clarity and consistency in communication across cultures and languages within the international IP community. Currently, terminological records can include up to ten languages (Arabic, Chinese, Korean, French, Japanese, English, Portuguese, Russian, Spanish, and German). The creation of Italian resources is currently in progress.

Users can search for terminology on the portal using the Linguistic Search feature. They can refine their queries by selecting source and target languages as well as subject fields. A list of terms is then displayed with its corresponding reliability value. In the event that the term is not available in one or more of the languages on the portal, WIPO Translate will provide a translation. By clicking on each term, users can view example sentences of its usage with corresponding sources, find the term on PATENTSCOPE, search for images on Google and check its concept map.

The full record features the subject field and subfield and the language in which the entry was first created (Figure 2.3).

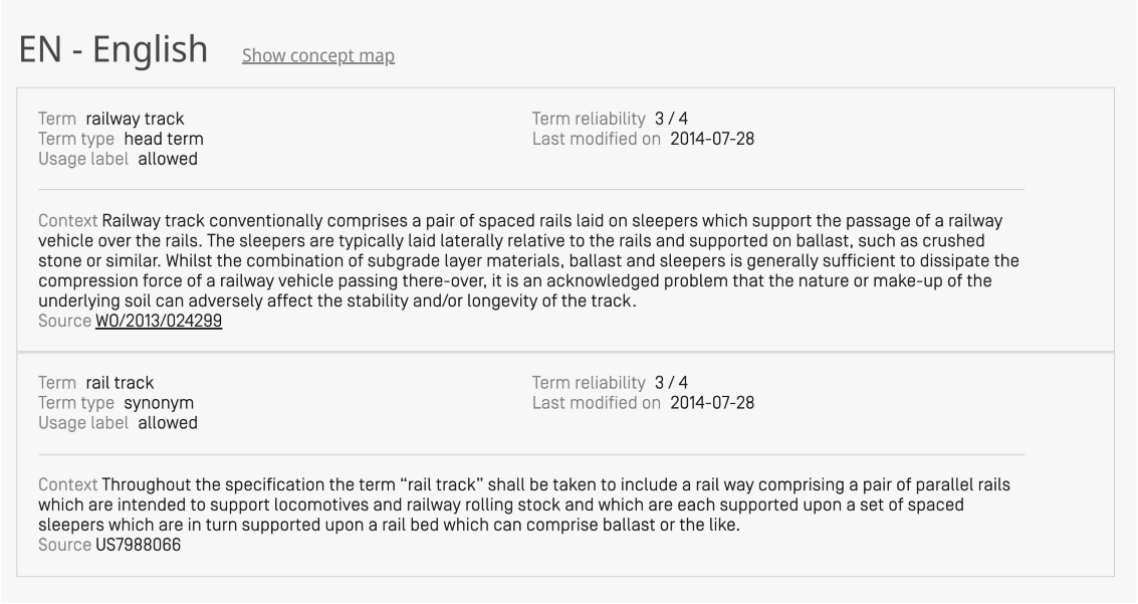


Figure 2.3. Full record of the English term *railway track* with its synonym.

Along with the Linguistic Search, the Concept Map Search is also available. Each

9. Available at: https://wipopearl.wipo.int/en/linguistic

bubble represents one of the 29 subject fields on WIPO Pearl, and by clicking on it the user can see its subfields (Figure 2.4).

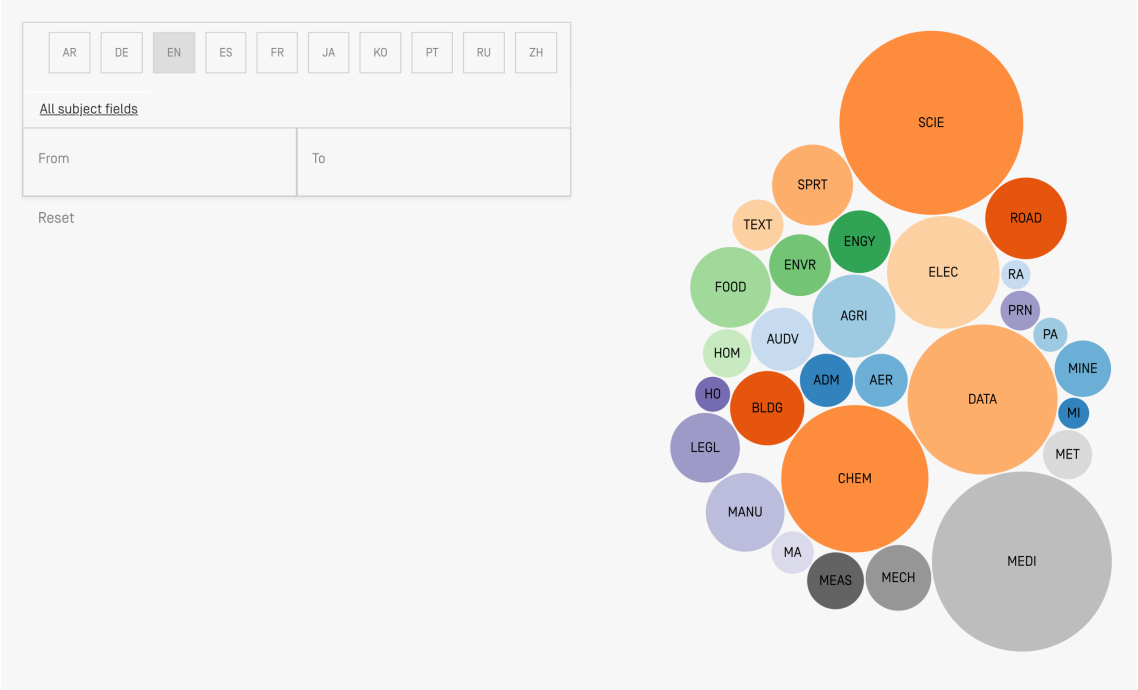


Figure 2.4. Concept Map Search feature on WIPO Pearl.

Each subfield has its own concept map. The WIPO Pearl concept maps illustrate generic, partitive and associative relations between concepts (Figure 2.5). By clicking on the terms, users can navigate to the full entries. It is also possible to visualize only the relation between two specific concepts of the same subfield and find patents in which one or both terms occur thanks to the Combined Keyword Search feature.

The primary goal of WIPO Pearl is to improve information exchange and mutual understanding in IP-related fields, thereby contributing to more effective and consistent management of intellectual property rights worldwide. In collaboration with university departments, WIPO works with graduate students from affiliated universities, allowing them to expand the terminology database with terms selected from a field of interest. This is the project on which this dissertation is based, and the preparation to the project itself is explained in Section 2.2.

2.2 Project preparation

At the very beginning of the project, I contacted my supervisor to discuss the possibility of working with WIPO. I also discussed details and deadlines with the project coordinator, who, after selecting the domain for which I would create the terminology records, gave me access to a Moodle course to learn the guidelines and

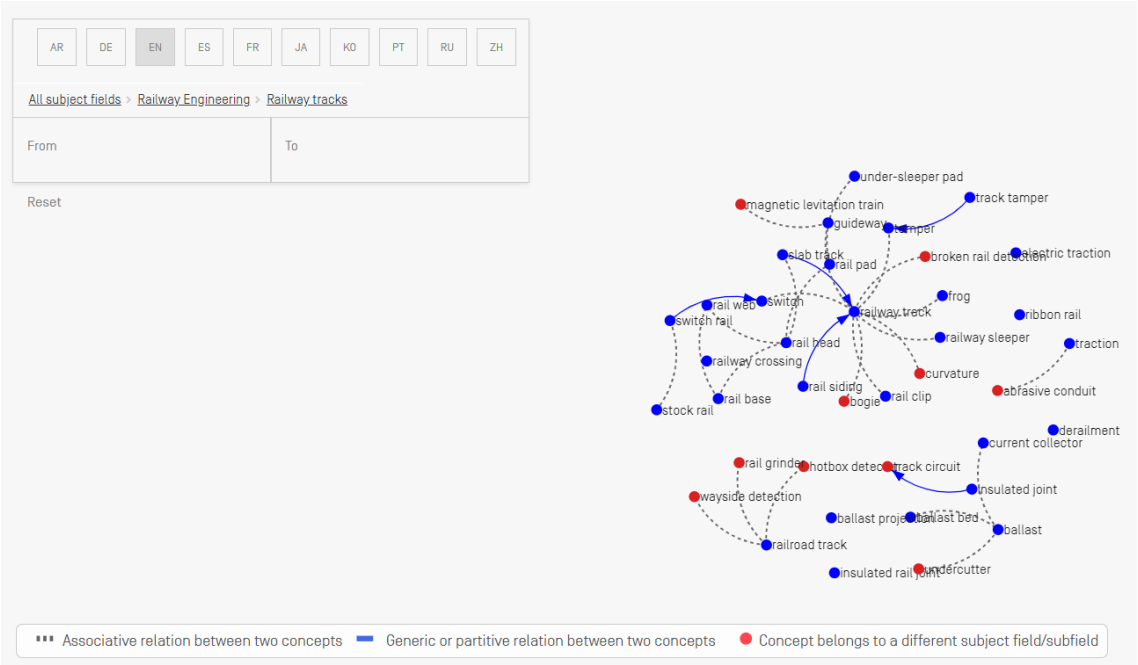


Figure 2.5. Concept map representing relations between concepts in the Railway tracks subfield.

workflow. This section details the preliminary actions taken.

2.2.1 Choice of the domain for the termbase

First, the research domain had to be chosen. I opted to increase the number of terms in a domain that does not contain many terms in WIPO Pearl. By using the Concept Map Search, I evaluated the number of concepts existing in each field, and discovered that there are indeed domains with even thousands of concepts: 5,012 in the SCIE (Natural & Applied Sciences) field, 4,797 in MEDI (Medical Science & Technology), 3,331 in DATA (Computer Science & Telecommunications), and 3,213 in CHEM (Chemical & Material Technology) at the time of writing. On the other hand, fields related to engineering aside from ELEC (Electrical Engineering) have a substantially lower number of concepts on the platform: 986 in ROAD (Road Vehicle & Automotive Engineering), 818 in CIVI (Civil Engineering & Building Construction), 639 in MECH (Mechanical Engineering), 535 in ENVR (Environmental & Safety Engineering) 416 in AERO (Aeronautics & Aerospace Engineering), 266 in MARI (Marine Engineering), and only 127 in RAIL (Railway Engineering).

For this reason, I checked the number of patents in the field of rail transport on PATENTSCOPE. I did so by performing a search on the platform by specifying the IPC class to which the results had to belong, i.e. B61. A search was performed using a query that retrieved all patents pertaining to IPC class B61 on the platform, regardless of filing office and language, found a total of 376,397 patents on PATENTSCOPE, underscoring the significant interest and innovation within this field.

In the end, I chose the domain of railway engineering as it has a limited number of terms on WIPO Pearl and gave me the opportunity to apply my language skills to this area of knowledge.

2.2.2 WIPO-PCT Terminology Course for Universities

Once the subject field was approved by the project coordinator, I gained access to the WIPO-PCT Terminology Course for Universities on Moodle that guides students in the creation of high-quality terminological entries for WIPO Pearl. This comprehensive course assists students in every step of the workflow, and provides useful linguistic resources for each language available on WIPO Pearl. The course consists of four parts: topic choice, corpus building, term extraction and selection, and context retrieval.

The first section of the course provides information of the choice of the topic and a brief explanation of what subject fields and subfields are in the context of WIPO Pearl; in this case it did not contain information of particular interest, since I had already chosen the domain before gaining access to the Moodle course.

The second section, on the other hand, proved to be extremely helpful as it provided tips on how to retrieve eligible topic-specific and language-specific documents for the corpus that also comply with the guidelines presented in Section 2.2.3. Suggestions for finding documents that relate to a specific area of knowledge and are, therefore, topic-specific, include identifying keywords that help understand the topic and making sure that they have a specific meaning in the designed field using dictionaries and other types of linguistic resources, as well as using these keywords individually or together to search for documents written in the working language and further refining the keyword list. To retrieve language-specific documents, i.e. texts written by native speakers of a given language so as to be representative of that language, WIPO suggests checking whether the publisher is located in a country where the working language is the main official language (or, in the case of patents, the country of the applicant's headquarters), and possibly checking the nationality of the author.

The third section focuses on term extraction, which can be done manually by examining the various documents in the corpus and identifying frequently occurring and contextually relevant terms for the subject field, or automatically by using term extractors, as also explained in Section 1.4.2. Regardless of the extraction method used, terms already present in WIPO Pearl should be excluded from the final selection.

The fourth and final section helps students select good contexts in eligible sources. Three types of contexts are accepted by WIPO: defining contexts, explanatory contexts, and associative contexts. Defining contexts lack the formal rigor of a termi-

nological definition. As outlined in Section 1.3, a terminological definition uniquely identifies a concept within a specific conceptual system, classifying it accordingly, a task that defining contexts do not perform. De Bessé (1997) also explains how terminological definitions must not contain the defined term, are formulated by legislators and standardization experts, and consist of one sentence. Defining contexts, on the other hand, include the defined term, are provided by the patent applicant, and often consist of two or more sentences. Nevertheless, defining contexts provide valuable information to help the reader comprehend a concept (Figure 2.6).

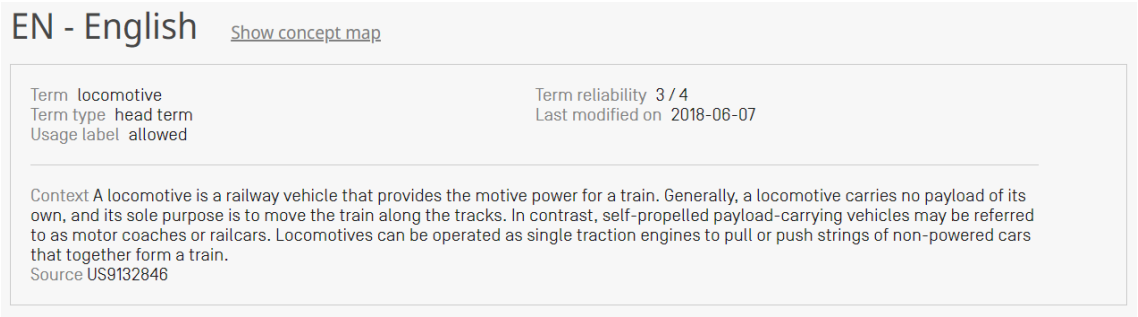


Figure 2.6. Example of a defining context on WIPO Pearl.

Explanatory contexts provide a brief explanation of a concept, but contain less significant information about the concept compared to defining contexts. They may describe the components and functionalities of the object or idea designated by the term (Figure 2.7).

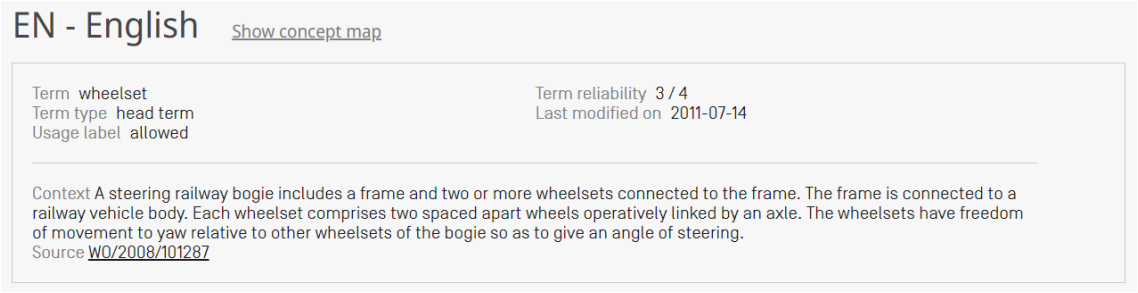


Figure 2.7. Example of an explanatory context on WIPO Pearl.

Finally, associative contexts, which contain the minimum information necessary to associate a concept with a specific subject area and demonstrate its use by experts in their native language (Figure 2.8). Defining and explanatory contexts are preferred over associative contexts, although they may not always be available.

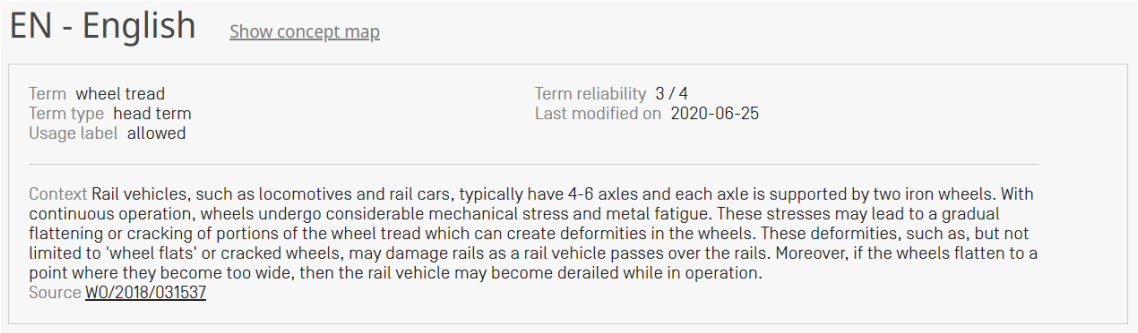


Figure 2.8. Example of an associative context on WIPO Pearl.

The course also included additional sections with language-specific resources in all available languages on WIPO Pearl, expect English. As my project includes Russian term entries, I consulted the Russian section for helpful resources to find Russian equivalents, such as concordancers based on bilingual texts, terminology databases, specialized glossaries and dictionaries, and machine translation tools. This section also provides guidance on retrieving defining and explanatory contexts in Russian, and refining searches on the Yandex search engine.

At the time of writing, the language-specific section for Italian is still under development, but the general tips provided in the course were still helpful in retrieving Italian equivalents and helped to better understand the WIPO terminology guidelines before starting the project.

2.2.3 WIPO guidelines for terminology records

In order to comply with WIPO standards for the creation of terminological records, I followed the guidelines provided at all stages of the project. The creation of the term list and the final terminological records, as well as the retrieval of relevant contexts were subject to strict requirements. For the creation of the conceptual system, no guidelines were given.

According to WIPO, eligible language-specific documents are patent descriptions, as well as scientific and academic articles (i.e. sources written by subject field experts who use correct terminology in their native language). Sources such as Wikipedia and blog articles, company websites, dictionaries, glossaries and terminology databases, as well as online sources cited with URLs in the term entries are considered ineligible. Obviously, the texts also must not be translations and are preferably written by native speakers of that language. For this reason, I developed the code for automatically retrieving patent descriptions on PATENTSCOPE setting the criteria outlined in Section 2.3.1.

As for terms, eligible ones must be noun phrases that designate a concept in a scientific or technical field and not just general descriptive terms and collocations, such as *control unit*, *steering system*, and *electric power*. These generic collocations,

for example, are not well-established terms in the field of automotive engineering, and can refer to different concepts that may belong to other subject fields. Lone adjectives, verbs and adverbs are also considered ineligible, along with set phrases, idioms and collocations. Abbreviated forms and spelling variants have to be taken into account when selecting a term.

The guidelines for selecting appropriate contexts for term entries are especially strict. As will be outlined in Section 3.2, many defining contexts had to be discarded since they did not comply with the criteria set by WIPO. Contexts must contain the term exactly as entered in the term field, although plural forms are eligible, and have to relate to the domain selected for the project. The guidelines also suggest (but not required) that the context in the source language should as far as possible contain the same information in the context(s) in the target language(s). As for the sources, they must comply with the same requirements set for the texts for the corpus.

2.3 Project workflow

After finishing the Moodle course and establishing the deadlines for the submission of the list of candidate terms in English as well as the creation of the final terminological records on Multiterm Online, I proceeded with the actual project. This section will offer a thorough description of the actions I took in the process.

2.3.1 Compilation of the corpus

Texts for term extraction were carefully selected according to the guidelines provided by WIPO on the Moodle terminology on corpus building. Thanks to WIPO's helpful indications on the Advanced Search feature on PATENTSCOPE, I was able to create queries on the platform to identify eligible, relevant patents in the field of railway engineering in order to maintain the integrity of the searches and the quality of the terminology corpus. Figure 2.9 shows the query used to retrieve patents in the railway field filed in English by inventors from countries where English is the official language (Australia, Canada, New Zealand, the United Kingdom, and the United States), with search results organized in descending order of publication, thus favoring the most recent patents.

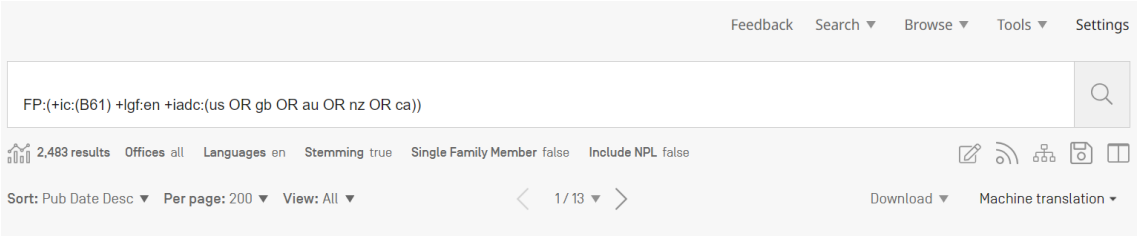


Figure 2.9. Query used to find relevant international patents for the corpus.

The query can be read as follows:

- *ic* indicates the international class to which results must belong; in this case, the query looks for patents in the entire Railway class (B61), subclasses included.
- *lgf* is the filing language of the applications; the value specified for this field is *en*, the ISO code for the English language, in order to make sure that the patents are originally filed in English and are not translated from other languages.
- *iadc* refers to the inventor nationality, with each possible nationality indicated by the corresponding two-letter ISO country code (AU for Australia, CA for Canada, GB for Great Britain, NZ for New Zealand, and US for the United States).

A first attempt to automatically extract text from patent descriptions was done using the BootCaT toolkit[10] originally developed by Baroni and Bernardini (2004), which allows to create *ad-hoc* large collections of texts found on the Web in a short time with a list of *seeds* as the starting point. The version of the tool I tried was 1.57, which has a GUI that the original version lacked. This version of the software can also take a text file with a list of URLs as input, so I tried to create an example list of patent URLs to avoid the option of copying and pasting all the texts into files manually. However, it failed at extracting patent descriptions from PATENTSCOPE since the patent webpages are dynamic. This means that they change as users interact with them, and BootCaT only captures the initial state of a webpage, which is the version that appears before any user input or interactions have occurred.

For this reason, a Python script[11] was developed to collect patent descriptions from PATENTSCOPE using the Selenium library.[12] The list of results obtained from the query shown in Figures 2.9 was downloaded in Excel format using the Download option on PATENTSCOPE. The metadata in the Excel spreadsheet was

10. Available at: https://bootcat.dipintra.it/
11. Code is available on GitHub at: https://github.com/racheeeeec/wipopatentscope
12. Documentation available at: https://www.selenium.dev/documentation/

then converted to .csv format for further processing. The patent numbers were used to generate the URLs of each patent web page and the Chrome web driver module in Selenium was used to automatically click on the Description tab and extract the text of the descriptions. In total, about 500 texts were extracted for each batch, and duplicates were discarded using another script. Each description was downloaded into a plain text file to facilitate processing with corpus analysis tools. Text files were automatically renamed by patent publication number to help locate the patent on PATENTSCOPE.

2.3.2 Selection of the candidate terms

After creating the corpus, the texts were analyzed by using the AntConc software. The next step involved the creation of a list of keywords using the *Keyword* tool. By reviewing the keyword list, I observed that several common terms had high frequencies. Thanks to the *Concordance* tool, which allows to view instances of a keyword or phrase in their surrounding context, I was able to check whether the keyword list presented parts of compound terms (terms formed by two or more words). For example, I discovered that the simple term *axle* often co-occurs with other terms and/or words, as shown in Figure 2.10.

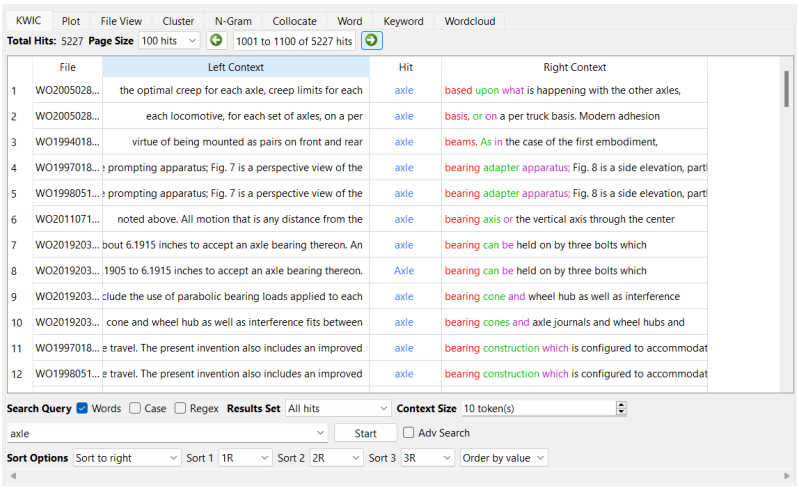


Figure 2.10. KWIC interface with *axle* as the input.

The *Clusters* tool allowed me to identify complex terms by generating uninterrupted lists of word and phrases that are often found in the same context or nearby in the text. Thanks to this feature, I found out that axle often forms part of complex terms such as *axle box*, *axle bearing*, and *axle counter*.

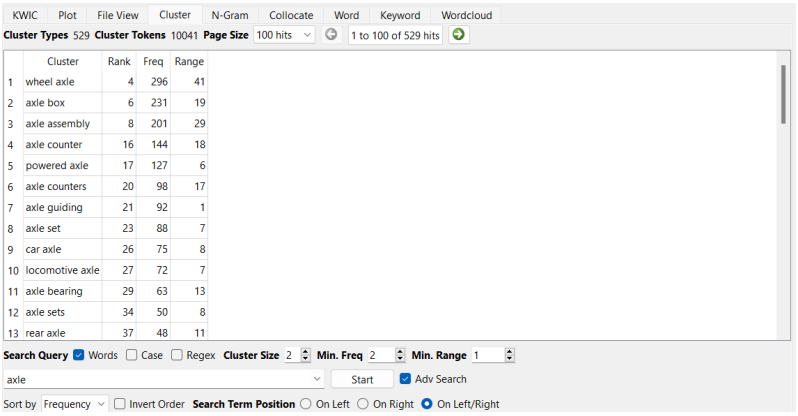


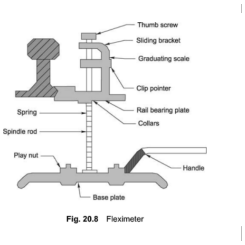
Figure 2.11. List of clusters with *axle* as the node word.

An external search process was conducted for each candidate term to confirm its validity and to identify definitions, explanations and visual references that would attest to its established use. Terms that were too generic (*vehicle control system*, *side bearing assembly*, *service braking*), occurred in just one patent (*island presence detector*, *wayside computing device*, *absolute coordinate system*) or did not conform to WIPO guidelines were excluded from the selection. The result of this complex process is a final list of candidate terms, accompanied by synonyms, acronyms, notes, and context information, which were added to an Excel document comprising 40 terms (30 plus an additional 10 as a reserve) to be submitted for WIPO evaluation.

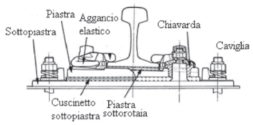
2.3.3 Retrieval of contexts and equivalents

The most challenging part in this task was finding equivalents in Italian and Russian. A throughout research of the English terms and the concept they represented was needed before looking for equivalents in other languages. For this reason, I searched for drawings and images as well as descriptions of the concepts expressed by each term to understand what I should be looking for when querying in Italian and Russian. For concepts relating to rolling stock and railway tracks, for example, drawings were incredibly helpful as they provided a visual representation of the object and let me comprehend what other objects tend to surround it. Furthermore, drawings usually contain a list of all the elements shown in it, and by finding similar pictures in Russian and Italian I was able to make comparisons and verify the position and the appearance of the object designated by each term. For instance, since many terms belonged to rail fastening systems, I compared drawings from the same perspective and possibly with legends (Figure 2.12).

Reference texts, such as glossaries and encyclopedias, although not eligible for being used as context in the terminological records, were extremely helpful. Since patent applicants often provide brief or incomplete descriptions of the elements mentioned in their documents, these sources provided further information. In Rus-



English



Italian

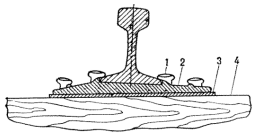


Рис. 2. Промежуточное костыльное рельсовое скрепление типа ДО: 1 — костыль; 2 — подкладка; 3 — нашпальная прокладка; 4 — шпала.

Russian

Figure 2.12. Drawings of rail profiles used as a reference for equivalents of *base plate*.

sian language, it was really easy to find this kind of literature online, whereas in Italian eligible sources and books are mostly printed and do not have an online version. Thanks to the Russian encyclopedia of railway transport (*Zheleznodorozhnaya Transporta. Entsiklopediya*) published in 1995, I was able to retrieve most Russian equivalents of rolling stock and railway track components. Even though some of the reference documents, like the encyclopedia, were printed in 1980s and 1990s, they were relevant as main components still are in use in today's vehicles and tracks.

There is a vast online collection of books, papers, and patents available in Russian, making it relatively easy to find eligible contexts in this language. The search engine used was Yandex, as it is the most popular one in Russia and is specifically designed for the Russian language. For the retrieval of contexts in patents, both PATENTSCOPE and Yandex Patents were employed. For Russian, no corpus was compiled. The reason for this is the fact that queries which specified Russian as the filing language would also retrieve patents filed by applicants outside of Russia. I tried to specify Russia as the applicant's nationality, but only 20 results were found. Since Russian patents would be employed just for extracting contexts, I only performed ad-hoc searches on PATENTSCOPE and Yandex Patents.

Defining contexts were selected over explanatory and associative ones, but in some cases this was not possible. Therefore, other types of eligible sources were consulted to find better contexts, such as academic papers, articles in journals, and books. Most of these documents were non-searchable, however, and OCR had to be performed. Although the quality of text recognition was not always optimal, it still facilitated the retrieval of terms within these documents. If neither of these sources provided a defining context, search shifted towards patents again to find at least an explanatory or associative context. If a context was retrieved from a patent on Yandex Patent, the Russian patent number would be converted in accordance with the WIPO guidelines when cited in the Source field of the terminological record.

As for Italian term retrieval, the amount of sources produced in Italian by specialists with Italian as their mother tongue was scarce. On PATENTSCOPE, only 187 patents in the field of railway engineering and filed in Italian were found. How-

ever, many of the applicants who drafted the patents found on PATENTSCOPE were foreigners, or the actual text of the patents was not available. For this reason, I tried to look for Italian patents using other patent search engines, such as Google Patents and Espacenet, an online patent database maintained by the European Patent Office (EPO). The former did not provide any relevant result, and actually showed irrelevant results pertaining other subject fields, where the latter was definitely the most helpful among the three search engines. Thanks to the advanced search option and search filters, it was possible to find patents filed in Italian by Italian applicants. However, I was not able to retrieve most of the equivalents of the candidate terms nor find eligible, defining contexts. For this reason, I decided to look for other types of sources, such as academic papers, doctoral thesis and articles in journals with Google Scholar. Libraries were also helpful since most publications are still printed or do not provide online access. Most sources I consulted are published by CIFI (Collegio Ingegneri Ferroviari Italiani), the prominent association of railway engineers in Italy. This means that these texts have been written in Italian language by specialists in their field, using terminology that is used by people who work in railway engineering. These books contained plenty of pictures and drawings depicting rail vehicles and tracks with the names of their components, as well as descriptions of safety and signalling systems. However, Italian sources only provided information about Italian vehicles and railway systems, and therefore lacked pictures and explanations of several concepts that belong to railways in English-speaking countries.

Despite all the research done, for some terms it was impossible to find eligible contexts, or even equivalents, in Italian. Better results were achieved in Russian, although some of the contexts were still not as good as the English ones. This difference in the quality of results greatly depends on the number of sources found, but also on the difference in terminological consistency between the two languages, as will be explained in Chapter 3.

2.3.4 Creation of the terminological records

Along with the search for contexts and equivalents in Russian and Italian, the process of creating the terminological records began. After the list of candidate terms in English was approved, the project coordinator provided me with the credentials for the final termbase on the WIPO server. The software used to create the terminological records was MultiTerm Online.

The termbase template was provided by WIPO, along with the updated guidelines for creating terminological records for WIPO Pearl. The records consisted of three levels: the entry level, the language level and the term level. The entry level includes fields relevant to the entire record and all the languages within it, providing

information about the subject matter addressed in the record, and consists of three mandatory fields, namely the Subject field and Subject subfield, which collocate the concept in a specific area of knowledge according to the WIPO Pearl subject field classification, and the Original Entry Language (OEL) field, which indicates the language of the term that led to the creation of the record. For all terms in this termbase, the Subject field was filled in with the value "RAIL (Railway Engineering)", while the selected OEL was English. The Subject subfield, however, changed depending on the term. The RAIL field contains the following subfields:

- Auxiliary equipment
- Maintainance & repair
- Propulsion systems
- Railway tracks
- Rescue & safety
- Rolling stock
- Signalling & points

The language level did not include any mandatory fields, while the term level had the most. This level contains information about the term itself, its degree of reliability, its status and usage within the scientific and technical community, and evidence of its occurrence in specialized literature. This means that while the entry and language levels are common to the head term and its synonym(s), the term level is exclusive to each one of them. Mandatory fields at this level are Term type (to determine whether the term is a head term or synonym), Context, and Source fields. For most terms, especially synonyms, additional fields were also filled in, such as Term description, which indicated whether the term was an abbreviated form of the head term or a geographical variant, and Term Note, which allowed me to write additional information about the term and provide contexts that did not comply with WIPO's guidelines and could not be included in the Context field.

The fields at the term level needed to be filled in for synonyms as well. In this context, the term *synonym* refers not only to words that have (nearly) the same meaning as another word, but also to abbreviated forms and geographical variants, since they would not be considered head terms. For each synonym to be registered, WIPO requires a context different from the one used for the head term, except for abbreviations and acronyms, which do not need a different context if they occur in the context of the head term; in this case, only the Source field had to be filled in.

Figure 2.13 shows an example of a terminological record containing an abbreviated form.

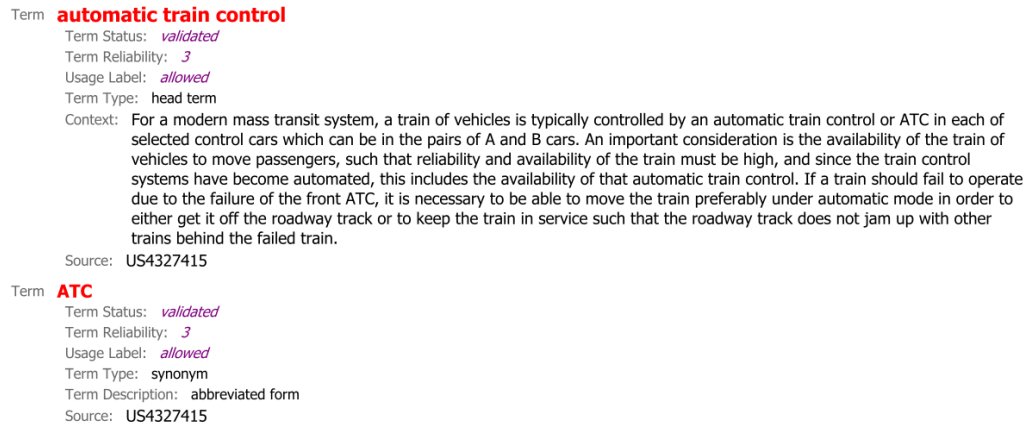


Figure 2.13. Example of a terminological record with an abbreviated form.

For geographical variants, a Term description field was filled in with the corresponding language code (Figure 2.14).

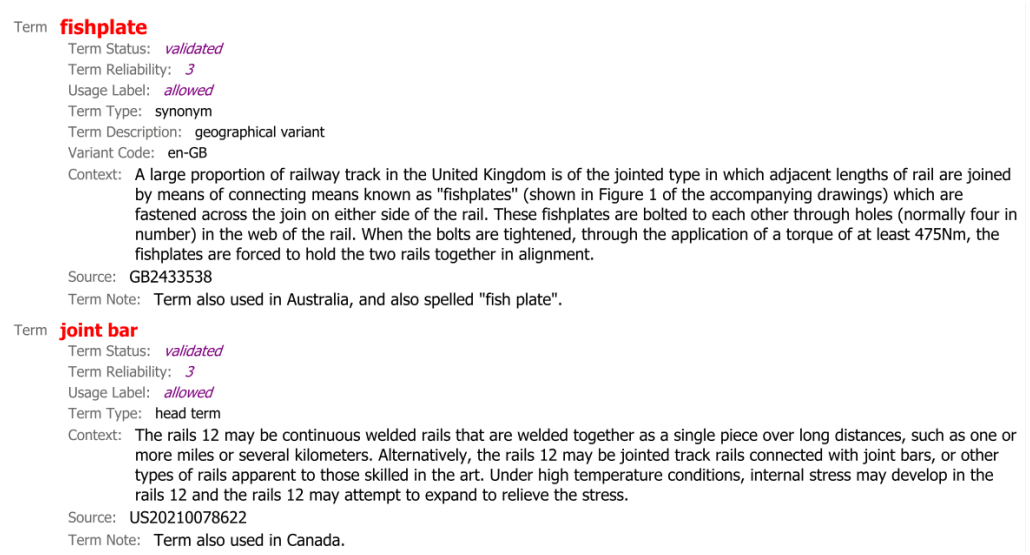


Figure 2.14. Example of a terminological record of a geographical variant.

While creating the records and filling in the required fields, I encountered several issues on Multiterm Online. If I forgot to fill in a mandatory field, the entry would be locked by the software and each time this error occurred, an e-mail was sent to the technical assistance so that they would unlock it. Error messages also appeared in the case of a sudden disconnection from the server, even though the Internet connection was stable. In addition, after WIPO terminologists began validating the entries, some of the corrections I made before the deadline were reversed.

After finishing all the terminological records (see Appendix B), the terminologists started the process of checking and validating the terms by directly accessing the

termbase on the WIPO server. An e-mail was sent to the project coordinator with a brief report of the steps taken and the conceptual systems in PDF format, the creation of which is described in Section 2.3.5.

2.3.5 Creation of the conceptual systems

While searching for eligible contexts and sources, I also worked on the conceptual systems, which have been created following the WIPO notation system to simplify the eventual process of integrating the new concepts. The software draw.io[13] allowed to easily create the maps, reproducing the same visual representation of the maps on the WIPO Pearl platform. The concepts were categorized according to the Subject subfield classification chosen during the creation of the respective terminological records, and a map was created for each subfield (see Appendix A for all the maps).

Although not mandatory, the project coordination suggested that relationships be established between the terms found in the context of this project and terms already present in WIPO Pearl. Relations were also signaled between terms belonging to different subfields. Different types of relations are represented with different types of lines: arrows indicate generic and partitive relations, according to their direction, while dotted lines represent associative relations, as in the maps on WIPO Pearl. Distinctions between different types of terms have also been signaled using different formatting: candidate terms are in black without formatting, terms which are present in the WIPO Pearl database are underlined, and terms belonging to other subject fields and subfields are in red. Figure 2.15 shows the legend of Italian and Russian concept maps, which also include proposed terms, shown in blue.

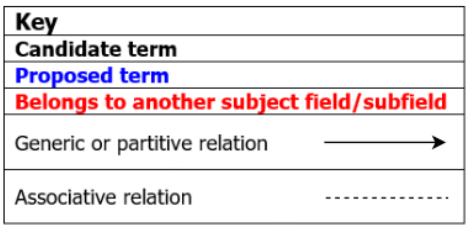


Figure 2.15. Legend for Italian and Russian concept maps.

The same steps were repeated for the Italian and Russian concept maps, and while the terms on WIPO Pearl had Russian equivalents that could be included in the concept maps, this was not the case for Italian. As mentioned in Section 2.1.4, the Italian language is currently being added to the platform, but at the time of writing there are no concept maps in this language. For this reason, the concept

13. Online version available at: http://draw.io/

systems in Italian look significantly different from the maps in English (Figures 2.16 & 2.17).

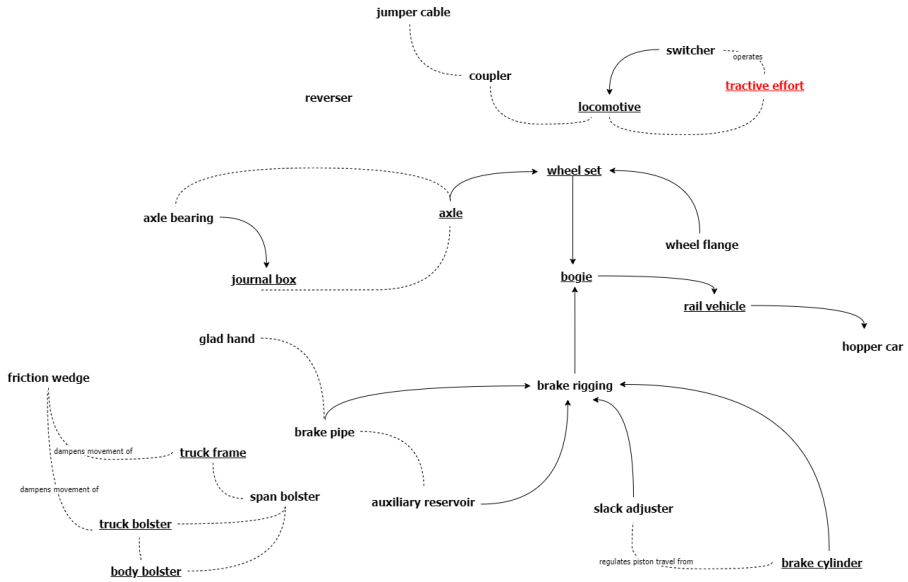


Figure 2.16. Rolling stock concept map in English.

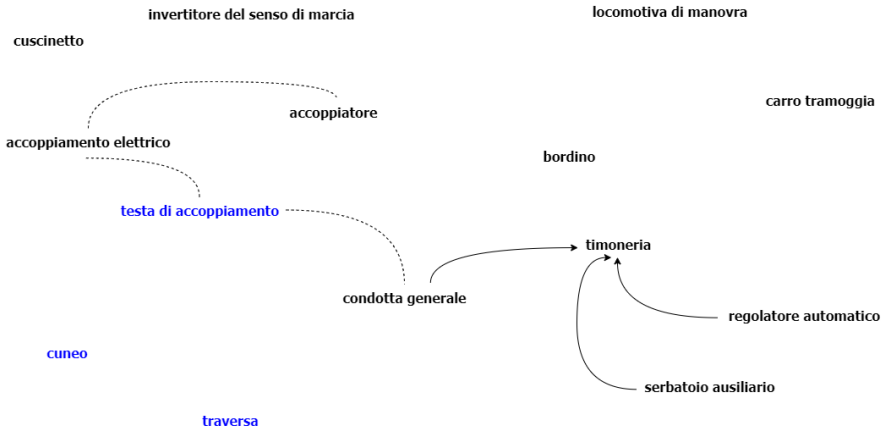


Figure 2.17. Rolling stock concept map in Italian.

2.4 Summing up

This section illustrated WIPO's goals and some of its platforms, the preparation ahead of the project, and the workflow from the compilation of the corpus to the creation of the final terminological records and conceptual systems.

Chapter 3 will present the feedback provided by WIPO and shift the focus to the methodological decisions that had to be made while searching for equivalents and contexts.

3 Methodological decisions

This chapter describes the approach taken to solve a number of issues encountered in the project. Section 3.1 presents the feedback that WIPO provided on the final terminological records and outlines the assessment criteria. Section 3.2 provides examples of decisions pertaining to the guidelines provided by WIPO regarding contexts and sources. Section 3.3 covers the differences in rail terminology among the linguistic variations within the English language, and explains how this problem has been addressed in the project. Finally, section 3.4 addresses Italian-specific issues, such as the lack of eligible sources in Italian, inconsistencies in terminology, and absence of some equivalents.

3.1 Feedback from WIPO

WIPO rated as 'A' (Acceptable) the 88% of the candidate terms provided, i.e. 109 terms out of a total of 124. For each terminological record, entries were rated by three different terminologists in accordance with their working language. In this evaluation system, the ratings are independent of each other; therefore, if the English term in one record is not acceptable, the Italian and Russian terms may still be accepted.

These terms are to be published after validation in WIPO Pearl, including credits to the Department of Interpreting and Translation (DIT) and the University of Bologna. The conceptual systems will be integrated into the existing concept maps on WIPO Pearl.

Contributions are deemed 'Not Acceptable' when they contain one or more major errors, such as inaccuracies or omissions in key termbase fields, or too many minor errors that decrease the overall reliability of the entry. WIPO distinguishes types of errors according to seven categories: subject field and subfield, term, context, source, database integrity, i.e. a criterion that ensures that data fields are correctly and consistently filled in, proofreading, and transcription, which only concerns contributions in Chinese and Japanese.

Minor errors, such as misspelled words, incorrect categorization of the head term and the synonym, missing information in the Source field, etc., were found in the terminological records, but they did not prevent WIPO from rating the terms 'Acceptable.' Unlike for major errors, WIPO did not provide a full description of the minor errors encountered in the final terminological records but rather signaled the error code corresponding to the category of the mistake on the assessment criteria sheet.

Therefore, in this project, only major errors prevented WIPO from selecting terms. Among the terms that were not selected, seven were English (*coupler*, *de-*

railer, *derail*, *end-of-train unit*, *head of train unit*, *HOT unit*, *track gauge*), seven were Italian (*leveraggi del freno*, *deragliatore*, *EOT*, *level crossing predictor*, *dispositivo di testa*, *invertitore*, *traversa*), and one was Russian (*БИВ*). These terms were not accepted due to incorrect equivalents, ineligible sources, and the same context for head terms and synonyms. Details on the types of major errors flagged by WIPO for each term are provided in Sections 3.2 and 3.4.3.

3.2 Compliance with the guidelines

As explained in Section 2.2.3, the guidelines provided by WIPO were extremely strict with regard to sourcing for contexts. Patent descriptions are considered to be the best type of sources for term entries, however, it was not always possible to retrieve contexts from patents, especially for Italian terms (see Section 3.4.1). In cases where it was not possible to find eligible contexts and/or sources, terms had to be marked as *proposed* instead of *candidate*. An ineligible context would still be included in the terminological record in the Term Note field instead of the Context field, which is not mandatory for proposed terms, whereas the Source field had to contain 'WIPO in collaboration with DIT, Università di Bologna,' as suggested by the project coordinator (Figure 3.1).

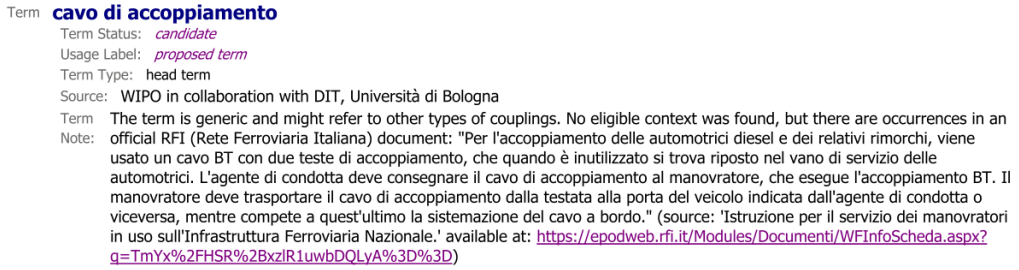

Term **cavo di accoppiamento**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: The term is generic and might refer to other types of couplings. No eligible context was found, but there are occurrences in an official RFI (Rete Ferroviaria Italiana) document: "Per l'accoppiamento delle automotrici diesel e dei relativi rimorchi, viene usato un cavo BT con due teste di accoppiamento, che quando è inutilizzato si trova riposto nel vano di servizio delle automotrici. L'agente di condotta deve consegnare il cavo di accoppiamento al manovratore, che esegue l'accoppiamento BT. Il manovratore deve trasportare il cavo di accoppiamento dalla testata alla porta del veicolo indicata dall'agente di condotta o viceversa, mentre compete a quest'ultimo la sistemazione del cavo a bordo." (source: 'Istruzione per il servizio dei manovratori in uso sull'Infrastruttura Ferroviaria Nazionale.' available at: https://epodweb.rfi.it/Modules/Documenti/WFInfoScheda.aspx?q=TmYx%2FHSR%2BxzlR1uwbDQLyA%3D%3D)

Figure 3.1. Example of a proposed term with an ineligible source.

Most of the contexts found in English and Russian were eligible. In some cases, however, associative contexts had to be chosen over defining or explanatory contexts because the eligible sources lacked definitions. For example, all the defining and explanatory contexts found for *подрельсовая подкладка* (Russian equivalent for *base plate)* were found in patents belonging to IPC classes other than the railway class (B61), such as:

> **Подрельсовая подкладка** относится к конструкции верхнего строения железнодорожного пути, в частности к элементу узла промежуточного рельсового скрепления, а именно к **подрельсовым подкладкам**, предназначенным для установки подошвы рельса. **Подрельсовая подкладка** содержит основание (1), на верхней поверхности которого

выполнен подрельсовый участок (4) с поперечными выступами (5), и подклеммные участки (6), образованные поперечным выступом (5) и продольными выступами - крайними (7) и средним (8) [emphasis added][14]. (Patent RU0000168914)

This context provides information about the position and composition of base plates in the railway tracks and their use. However, the source of this context was ineligible, because it belonged to IPC class E01, the class of road, railway, and bridge construction, which includes patents related to rail fastening components but does not belong to class B61. For this reason, an associative context was inserted in the respective field instead:

Брус железобетонный (поз. 1) выполнен с трапециевидными выемками (поз. 2) для установки углонаправляющих плит (поз. 3), между которыми на *подрельсовые подкладки* (поз. 4) установлен рельс (поз. 5), причем рельс крепится к брусу железобетонному при помощи шурупа-дюбеля (поз.6), установленного в отверстие (поз. 7) и упругих клемм (поз. 8) [emphasis added][15]. (Patent RU0000216547)

Although this associative context does not include information about the position, composition or function of base plates, it was eligible because the patent belongs to IPC class B61.

Ineligible contexts also prevented WIPO from selecting five terms since they represented a major error according to the assessment criteria. For example, the terms *end-of-train unit* and *head of train unit* were not selected due to the fact that the context did not include the term as entered in the Term field. In fact, in both contexts, the lexical items that form the terms are divided by acronyms of the first item shown in brackets, respectively *(EOT)* and *(HOT)*. In retrospect, I could have sought out more appropriate contexts:

End-of-train (EOT) units coupled to the rear railroad car of a train are used extensively by railroads, and are configured to monitor air pressure in the air brake pipe, which runs the length of the train, as well as

14. **Base plate** relates to the structure of the upper structure of the railway track, in particular to the element of the intermediate rail fastening assembly, namely to **base plates** intended for installation of the rail sole. The **base plate** contains a base (1), on the upper surface of which there is a sub-rail section (4) with transverse projections (5), and sub-clamp sections (6) formed by the transverse projection (5) and longitudinal projections - extreme (7) and middle (8). (Translated by Rachele Raspanti)

15. The reinforced concrete bar (pos. 1) is made with trapezoidal recesses (pos. 2) for installation of angle guide plates (pos. 3), between which a rail (pos. 5) is installed on **base plates** (pos. 4), and the rail is fastened to the reinforced concrete bar by means of a dowel screw (pos. 6) installed in a hole (pos. 7) and elastic terminals (pos. 8). (Translated by Rachele Raspanti)

> other parameters, such as motion. Mounted to the last railcar, the EOT unit is normally coupled to the brake pipe by means of a hose and a glad hand [emphasis added].
>
> Railroads (AAR), two-way EOT systems typically feature a locomotive control unit (LCU) 51 in the lead locomotive 2 and an EOT unit 55 connected to the brake pipe typically on the last railcar in the train. Also referred to as a **head of train (HOT) unit**, the LCU is mounted to the train operator's console in the locomotive 2 [emphasis added].

The terms *coupler* and *track gauge* were also rejected, because the contexts were actually extracted from translations of patents.

3.3 Rail terminology in English varieties

When railroads were first introduced and developed in the 19th century, both the United States and Britain had their own unique approaches to building and operating railways, as well as designing rail vehicles (Encyclopedia Britannica 2023). These differences in the history of railways led to discrepancies in English rail terminology that persist to this day, despite an attempt by the International Union of Railways to standardize it. Such issue needed to be addressed while creating English term entries.

3.3.1 Attempt at standardization

The International Union of Railways (also known as *Union internationale des chemins de fer* in French, abbreviated UIC), the worldwide professional association representing the railway sector and promoting rail transport,[16] made efforts to standardize railway terminology.

To do so, RailLexic Online[17] (RLO) was established as a leading reference and term bank for multilingual rail terminology. It presents a collection of approximately 12,000 railway concepts, along with associated terms in 24 languages, namely Arabic, Czech, Danish, Dutch, English, Esperanto, Finnish, French, German, Hungarian, Italian, Japanese, Norwegian, Persian, Polish, Portuguese, Romanian, Russian, Serbian, Slovak, Slovene, Spanish, Swedish, and Turkish. The UIC Terminology Group has categorized these concepts into 105 specialized railway subject areas and contain annotations with grammatical information. The goal of the group is to enable experts to concentrate on the technical aspects of projects without being hindered by language barriers; however, while doing research for creating the list of

16. More information available at: https://uic.org/about/about-uic/
17. More information available at: https://uic.org/support-activities/terminology/

candidate terms, it became evident that differences in rail terminology among the linguistic variations within the English language still exist, particularly in regards to patents.

3.3.2 Differences in rail terminology in patents

Investigating and determining the terms used in each variety and their differences in usage was essential. Differences in railway terminology predominantly exist between American and British English. Table 3.1 shows examples of differences between American and British rail terms retrieved from The Railway Technical Website[18] by Dr. Piers Connor.

en-US	**en-GB**
conductor	guard
freight car	goods wagon
grade crossing	level crossing
railroad	railway
switcher	shunter
tie	sleeper

Table 3.1. Examples of differences in English rail terminology.

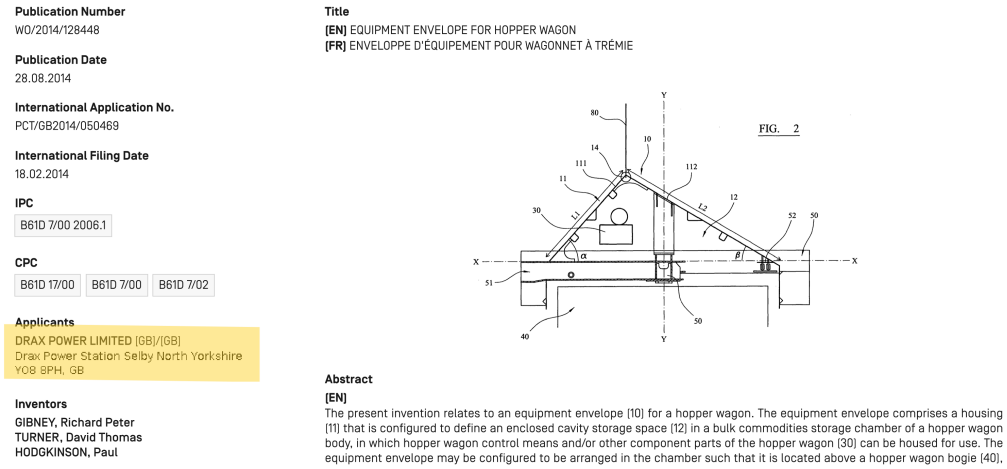
In order to determine if a candidate term is used in both American and British English or just in one, and which one it belongs to, I consulted glossaries created by companies and agencies from English-speaking countries. For British terms, I consulted the *Glossary of Railway Terminology*[19] published by the Rail Safety and Standards Board (RSSB), a non-profit organization owned by major industry stakeholders in Great Britain. The *Compendium of Definitions and Acronyms for Rail Systems*[20] created by the American Public Transportation Association (APTA) proved helpful for verifying American rail terminology. While conducting research on geographical variants, I encountered a glossary[21] that also includes terminology used in Australia and New Zealand. It was published by the Rail Industry Safety and Standards Board (RISSB), which aims to standardize safety practices throughout the Australian rail sector through cooperative efforts, while promoting knowledge exchange and networking opportunities via forums, groups, and committees.

18. Source: http://www.railway-technical.com/glossary/us-uk-terminology.html
19. Available at: https://www.rssb.co.uk/standards-catalogue/CatalogueItem/gert8000-gloss-iss-7
20. Available at: https://www.apta.com/wp-content/uploads/APTA-Compendium-of-Definitions-Acronyms-for-Rail-Systems.pdf
21. Available at: https://www.rissb.com.au/glossary/

Thanks to these resources, I became familiar with these geographical differences before extracting the candidate terms.

The corpus built to extract the English candidate terms for WIPO was a valuable aid in this process. As outlined in Section 2.3.1, each patent description downloaded from PATENTSCOPE was pasted into a text file renamed after its publication number, which was then analyzed with AntConc. I used the KWIC and the File View features to check contexts for each term of research and find out in which files the term occurred. This allowed me to find the publication numbers of the patents that included the term, and I was able to check information about applications. Thus, I verified the applicant's nationality and determined to which linguistic variant a specific term may belong.

For example, I researched the term *hopper wagon*, and found occurrences in patent WO/2014/128448. Then, I checked the information on the patent webpage on PATENTSCOPE and discovered that the applicant's headquarters are located in Great Britain (Figure 3.2). Further research on Google revealed that the inventors are British as well.



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International Filing Date
18.02.2014

IPC
B61D 7/00 2006.1

CPC
B61D 17/00 | B61D 7/00 | B61D 7/02

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Inventors
GIBNEY, Richard Peter
TURNER, David Thomas
HODGKINSON, Paul

Title
[EN] EQUIPMENT ENVELOPE FOR HOPPER WAGON
[FR] ENVELOPPE D'ÉQUIPEMENT POUR WAGONNET À TRÉMIE

FIG. 2

Abstract
[EN]
The present invention relates to an equipment envelope (10) for a hopper wagon. The equipment envelope comprises a housing (11) that is configured to define an enclosed cavity storage space (12) in a bulk commodities storage chamber of a hopper wagon body, in which hopper wagon control means and/or other component parts of the hopper wagon (30) can be housed for use. The equipment envelope may be configured to be arranged in the chamber such that it is located above a hopper wagon bogie (40),

Figure 3.2. Main information about patent WO/2014/128448 on PATENTSCOPE.

For some terms, I found definitions which also included geographical variants, as in the case of the candidate term *grade crossing predictor* in patent US16622303:

> A **grade crossing predictor** (often referred to as a crossing predictor in the U.S., or a **level crossing predictor** in the U.K.) is an electronic device that is connected to the rails of a railroad track and is configured to detect the presence of an approaching train and determine its speed and distance from a crossing (i.e., a location at which the tracks cross a road, sidewalk or other surface used by moving objects) [emphasis added].

The term **cab signaling**, on the other hand, is both a spelling and a geographical

variant. Since the spelling changes according to the English variety, the term was still signaled as a geographical variant in the term entry and the country code was added. In this case, defining contexts were not found, therefore an associative context was selected instead. The difference in spelling was noticed by comparing term occurrences in patents filed by American and British applicants:

> Further, the system and technique may be used in track circuit applications in which the transmitter and receiver are located at spaced locations along the rails to detect the presence of a train in the interval between the transmitter and receiver. They may also be used for **cab signaling** in which the transmitter is located along the rail and the receiver is located on-board a locomotive for transmitting information from wayside to the locomotive, such as signal aspect information [emphasis added]. (Patent US10743591)

> Both System A and System B inform the train driver 4 him how far and how fast the train is authorized to proceed, as determined by interlocking equipment 5. System A presents this information to the driver 4 from a display (not shown) within the driving cab, and this is known as '**cab signalling**'. System B presents the information to the driver 4 from components of its trackside equipment 3B, known as 'signals'. System B may supplement this information from signals with information presented within the driving cab [emphasis added]. (Patent WO/2013/153396)

In the project described in this dissertation, American rail terms were selected as head terms, with British variants classified as synonyms. The geographical variant was specified in the Term Description field and the corresponding language code was provided. Table 3.2 displays the head terms in the left column with their geographical variants in the right column.

en-US (head term)	**en-GB (geographical variant)**
cab signaling	cab signalling
joint bar	fishplate
grade crossing predictor	level crossing predictor
hopper car/hopper railcar	hopper wagon

Table 3.2. Candidate terms which change according to language variant.

3.4 Problems specific to Italian language

3.4.1 Lack of Italian eligible sources

As already mentioned in Sections 2.3.3 & 3.2, there were issues with the retrieval of Italian sources which would comply with the guidelines provided by WIPO.

Finding patents filed in Italian was especially challenging. On PATENTSCOPE, I created a query to retrieve patents originally filed in Italian by Italian inventors and obtained 154 results. However, the descriptions of the patents found using this query were English translations of the original Italian text. The research was refined by selecting 'Italy' as the national office of the application, but I obtained zero results. PATENTSCOPE was still useful in performing ad-hoc searches for contexts (Figure 3.3), even though it would not retrieve results if I specified the original filing language and the inventor's nationality in the queries.

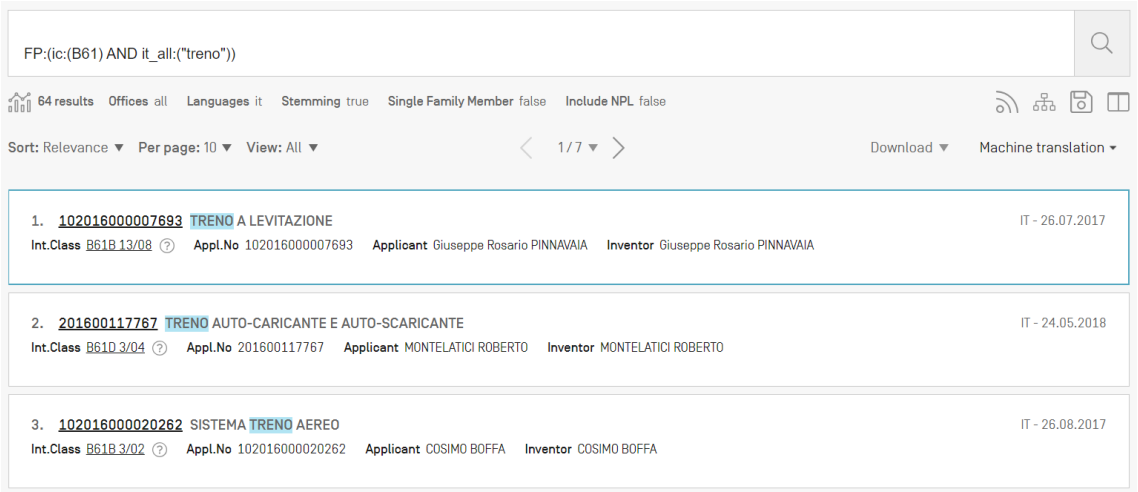

Figure 3.3. Result window of an Italian query on PATENTSCOPE.

As previously stated in Section 2.3.3, a search was performed on the Espacenet platform to find Italian patents instead, and I obtained 458 results. however, the retrieved applications included publications from other patent offices that would be considered ineligible by WIPO. Thus, further research was needed to find the Italian publications and extract the original descriptions. Figure 3.4 shows the search interface of the Espacenet platform with the preview of a patent on the right.

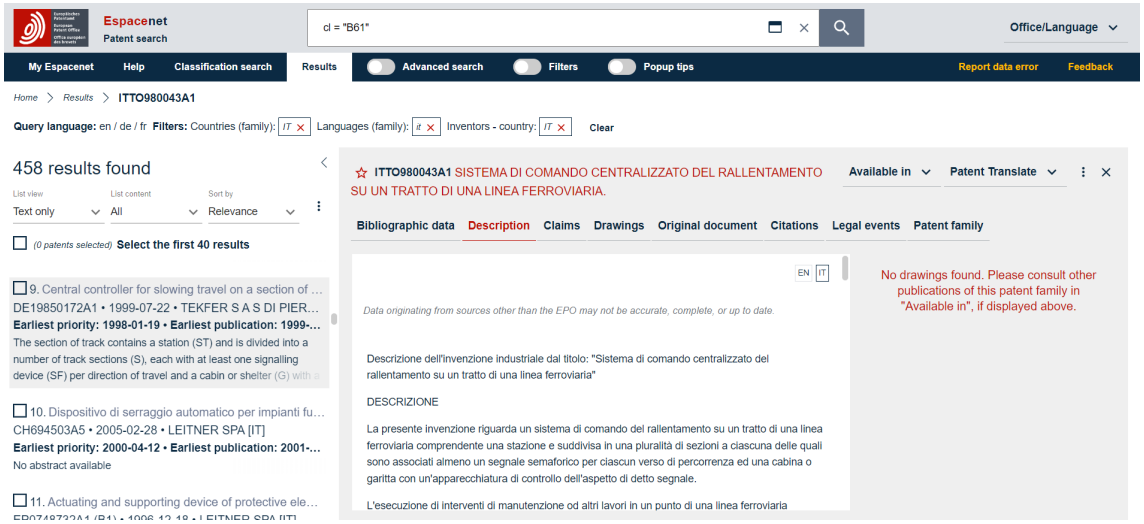

Figure 3.4. Search interface with the preview of an Italian patent on Espacenet.

Although several Italian patents were found and ad-hoc searches were conducted on both PATENTSCOPE and Espacenet to find Italian equivalents of the candidate terms, only 7 contexts out of 30 were extracted from patents. For this reason, other types of sources were used to find contexts, namely doctoral theses and books. Although most of the theses retrieved on Google Scholar were not open access, those that were accessible allowed for easily searching for relevant terms and contexts using the Search feature on PDF files. On the other hand, most books used as sources were available in print, and efforts to perform optical character recognition on pictures of the pages were unsuccessful, probably due to the low quality of the images. The OCR results could have been improved if the books had been digitized with a scanner, even if it is a time-consuming task. As it was not possible to copy and paste text from most sources into text files, the Italian corpus was not created and instead, ad-hoc searches on PATENTSCOPE and Espacenet were performed.

3.4.2 Inconsistencies and generic terms

While researching Italian equivalents, I observed instances in which noun phrases that referred to the same concept differed by just one or two prepositions, even within a single text produced by the same author. This phenomenon concerns noun formations that differ from each other by their internal composition and the degree of mobility of their components, as explained by Voghera (2004, 57).

For example, while English only uses the term *cab signaling* (spelled *cab signalling* in British English) and Russian uses *локомотивная сигнализация*, Italian refers to the same concept with several similar noun phrases listed in Table 3.3. Ultimately, *ripetizione dei segnali in macchina* was selected as head term, since it has four occurrences in three eligible sources.

English	Russian	Italian
cab signaling	локомотивная сигнализация	ripetizione dei segnali in macchina
cab signalling		ripetizione in macchina dei segnali
		ripetizione del segnale in macchina
		ripetizione dei segnali in cabina
		ripetizione dei segnali a bordo
		ripetizione a bordo dei segnali

Table 3.3. List of variants of *cab signaling* in English, Russian and Italian.

Different variants of the term were encountered in the book *Lineamenti di infrastrutture ferroviarie* by Franco Policicchio (2007), one of the eligible sources that were used to find contexts. In one chapter, the author employs the term with both *segnali* in the plural and *segnale* in the singular:

> Il blocco a circuito di binario, pur essendo più costoso del blocco contaassi, presenta il vantaggio di consentire, oltre al controllo liberooccupato, anche il controllo della continuità dei binari e la **ripetizione dei segnali in macchina** attraverso l'invio lungo i binari di correnti 'codificate'; per questi vantaggi, è utilizzato nelle linee a più intensa circolazione e maggiori velocità (V maggiore di 150 km/h) [emphasis added]. (150)

> Le limitazioni del blocco fisso possono essere superate lasciando inalterato il numero degli aspetti dei segnali (3 aspetti) e la lunghezza delle sezioni di blocco (1350 metri) ma ricorrendo alla **ripetizione del segnale in macchina** [emphasis added]. (152)

In some cases, Italian terms are more generic compared to their equivalents in other languages. An example of this characteristic is the term *piastra*, which is the equivalent of *base plate* (or *tie plate*) in English and *подрельсовая подкладка* (or *подкладка*) in Russian. While in English, the noun *plate* is modified by either the noun *base* or *tie*, and in Russian, the noun *подкладка* is modified by the adjective *подрельсовой*, the noun *piastra* occurs as a simple term in the rail domain. The definition of *piastra* provided by the Treccani encyclopedia includes an example of usage in the field of building engineering, where *piastra* is followed by the phrase *di armamento*:

> Nella scienza delle costruzioni, nome delle lastre piane soggette a forze perpendicolari alla superficie media (per es., i solai piani realizzati con

> solette di cemento armato appoggiate o incastrate lungo i bordi, le paratoie metalliche soggette alla spinta idrostatica, ecc.), e anche di taluni elementi impiegati in varî campi delle costruzioni e aventi funzioni e caratteristiche diverse: p. di collegamento, di appoggio o di ripartizione, di rivestimento o di protezione, di carico o di sostegno; p. nodali, piastre di ancoraggio, ecc.; **piastre di armamento**, quelle interposte tra rotaia e traversina nei binarî ferroviarî e tranviarî [emphasis added]. (Vocabolario online Treccani)

However, no source included the phrase *piastra di armamento*, and the simple term is used instead. Searching for contexts for this term, I also encountered several instances where *piastra* was used to describe other concepts related to the same domain, including axle-bearing components:

> Normalmente i cuscinetti delle boccole sono montati con una leggera interferenza sul fusello (tolleranza n6) e un leggero gioco con la fusione del corpo boccola (tolleranza u9), mentre assialmente sono trattenuti sui due lati da una **piastra** e da un anello dove si trovano le guarnizioni di contenimento del grasso di lubrificazione dei cuscinetti stessi [emphasis added]. (Panagin 2006, 144)

It should be noted that in some cases, *piastra* occurred as the head of noun phrases, such as *piastra sottorotaia* or *piastra per controrotaia*, which are indeed more specific than the simple term *piastra*; however, such variants did not come from eligible sources, and the simple term is still more largely used by specialists, especially in patents. *Piastra* was therefore selected as the Italian head term with the following context:

> Nell'esempio di figura 1, la piastra 63A è inserita attraverso uno spazio esistente fra la rotaia R2 ed il terreno o la massicciata per agganciarsi alla parte del piede della rotaia R2 che è situata dal lato opposto della rotaia R2 rispetto al braccio di supporto 45. Per fissare stabilmente l'apparato di controllo 5 al binario T_R, la rotaia R2 è serrata fra la **piastra** 63A e la contro piastra 63B, preferibilmente tramite una coppia di bulloni di morsetto 64 (uno solo dei quali è rappresentato in figura 4) [emphasis added]. (Patent ITRM20120109)

Finding Italian equivalents for *glad hand* and *jumper cable* was challenging as well. While these two concepts are designated by complex terms in English, such is not the case in Italian. During my research, I learned that a *glad hand* is a coupling device used in connecting sections of a flexible hose between adjacent rail vehicles

that allows the hose sections to be detachably connected, forming a continuous pipeline stretching from the head locomotive to the last train car. Figure 3.5 shows the entire air hose assembly that is connected at the end of each train car, whereas Figure 3.6 is a drawing of the *glad hand* coupling.

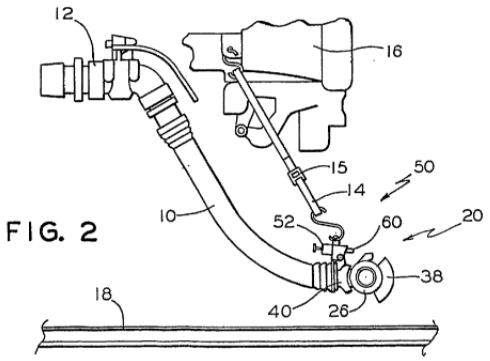

Figure 3.5. Drawing of an air brake hose assembly in patent WO/2006/026173A1.

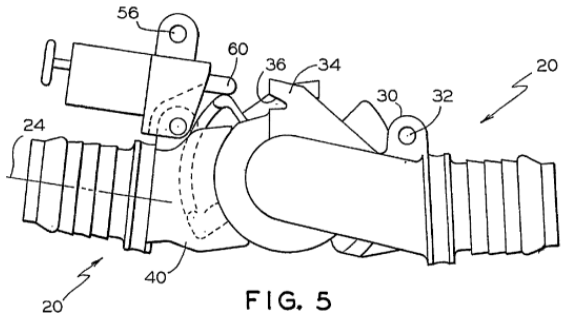

Figure 3.6. Drawing of a glad hand coupling in patent WO/2006/026173A1.

Most authors of the Italian sources I employed did not refer to the single components, but rather mentioned the air brake hose assembly on the whole, using various noun phrases, such as *semiaccoppiatori di testa* (Panagin 2006, 688) or *semiaccoppiatori flessibili* (ibid., 689).

Finally, I found *testa di accoppiamento* in a regulatory document issued by the Italian railway infrastructure manager RFI (Rete Ferroviaria Italiana), titled *Istruzione per il servizio dei manovratori in uso sull'Infrastruttura Ferroviaria Nazionale*, which covers the operating rules that rail operators must follow in order to couple and uncouple rail vehicles in Italy:

> Nei treni classificati viaggiatori, i manovratori devono congiungere fra loro, oltre che i flessibili della condotta generale, anche quelli della condotta principale per l'alimentazione dei servizi pneumatici esistenti. Per distinguerli fra loro, i rubinetti e le **teste di accoppiamento** della condotta generale sono verniciati di rosso, mentre quelli della condotta prin-

> cipale sono verniciati di giallo. Inoltre, le **teste di accoppiamento** della condotta principale sono realizzate in modo da non poter essere accoppiate con quelle della condotta generale del freno (Fig. 3) [emphasis added]. (40)

This example is then followed by a picture that shows the glad hand couplings of the brake pipe (in red) and the couplings of the other pneumatic hoses (in yellow). (Figure 3.7)

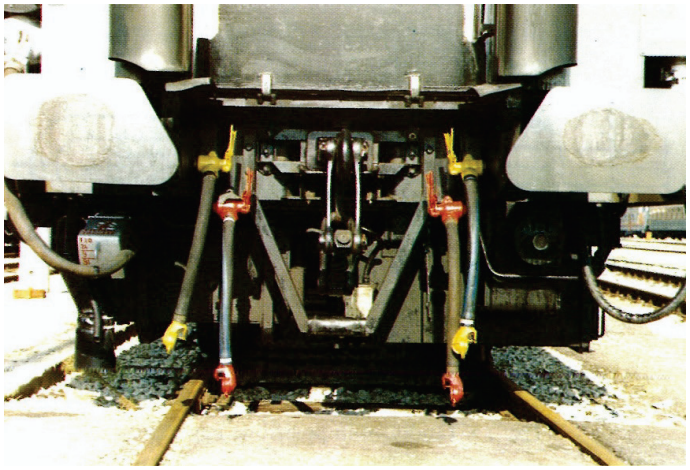

Figure 3.7. Picture of glad hand couplings.

However, the term *testa di accoppiamento* also refers to couplings of *jumper cables* and other types of cables, whereas the term *glad hand* only concerns couplings of air brake hose assemblies:

> Per l'accoppiamento della condotta elettrica a 78 conduttori dei treni navetta, i manovratori devono utilizzare l'accoppiatore mobile (**testa di accoppiamento**), che si trova sulla testata, alla sinistra di chi guarda sopra la traversa, e l'accoppiatore fisso (a presa) del veicolo attiguo, che si trova in basso sotto il respingente sulla destra di chi guarda la testata del veicolo adiacente [emphasis added]. (47)

3.4.3 Absence of Italian equivalents

For the terms *Automatic Warning System* (*AWS*), *derailer*, *level crossing predictor* and *span bolster*, I was unable to find any equivalent at all since the concepts designated by these terms are not common in Italian railway construction and rolling stock.

The term *Automatic Warning System*, for example, refers to a system that

> is provided to give train drivers in-cab warnings of the approach to signals, reductions in permissible speed, and temporary / emergency speed

> restrictions, and to initiate a brake demand in the event that a driver does not acknowledge cautionary warnings given by the system within the specified time. (*AWS and TPWS Interface Requirements* 2021)

AWS is one of the principal warning and train protection systems provided on the Great Britain mainline railway and on most rolling stock operating over them, but it is not used on Italian railways and none of the specialists of the sources consulted mentions it. For this reason, I opted for *Automatic Warning System* as a proposed term and it was accepted. This decision was made since most names of international rail safety systems and their acronyms are left untranslated, such as *European Rail Traffic Management System* (*ERTMS*), *Automatic Train Protection* (*ATP*), *Automatic Train Operation* (*ATO*), etc.

The same decision was applied to the term *level crossing predictor*, another rail safety system. Ricci et al. (2013, 281) mentions a *level crossing predictor*, but refers to a specific system developed by Westinghouse Brake & Saxby Signal Company, a British company that supplies railway signaling and control equipment to the global rail industry. The equivalent was left untranslated and the term entry was selected as a proposed term instead of candidate. However, in the feedback, the project coordinator suggested that a translation should have been proposed instead. In retrospect, this is a decision that could have been made at the time.

This issue also concerned terms related to rolling stock, namely *derailer* and *span bolster*. A derailer is "a device used to prevent the fouling (blocking or compromising) of a railroad track, typically a main line," (WO/2020/018457) but no information was found on the use of derailers in Italy, either in English or Italian. The suggested term *deragliatore* was rejected, as the project coordinator found *dispositivo di svio* as the equivalent of *derailer*.

No information or images of *span bolsters* were found in Italian sources, therefore no equivalent was proposed to WIPO. When used in truck assemblies, bolsters are usually referred to as *traverse*, *travi* or *assi*. *Traversa* was suggested as proposed equivalent for *span bolster*; however, no sufficient evidence was available in the literature to confirm its accuracy. In hindsight, no equivalent should have been proposed.

Conclusion

The objective of this project carried out with WIPO was to develop terminological resources in the field of railway engineering for the WIPO Pearl terminology platform. This experience allowed me to implement the knowledge acquired through the Information Mining and Terminology course in a real-life setting. I approached terminological work professionally by adhering to guidelines and meeting standard requirements and deadlines. This experience provided me with valuable insight into terminological work that will contribute to my growth as a linguist.

In the end, WIPO rated as 'A' (Acceptable) 88% of the candidate terms provided. These terms will be published in WIPO Pearl after validation in WIPO Pearl with credits to the Department of Interpreting and Translation of the University of Bologna. Despite the requirements that affected the quality of the results, most of the decisions I took were successful.

The Italian terms provided in this project will be among the first to be added to the database not only pertaining to the RAIL domain but among all domains. Most terms retrieved for this project belong to the *Rolling stock* and *Rescue & safety* subfields; however, this was done to focus only on certain aspects of this wide domain. Further terminological work may be conducted to enlarge the number of concepts in subfields of the RAIL domain that currently have a limited number of concepts, specifically, the subfields *Maintainance & repair*, and *Propulsion systems*, each currently containing seven concepts.

The process of building the corpus could also be further automated. The code could be improved to extract metadata from the full patent webpage on PATENTSCOPE. This metadata could be used to divide the corpus into subcorpora based on publication date, name of the applicants or inventors, etc. without running the code several times.

Moreover, the results of this project might serve as a foundation for future terminological work in the field of railway engineering, with the addition of Italian equivalents for existing terms in the RAIL domain on WIPO Pearl. The conceptual systems created for this project might also prove useful in developing conceptual relations between equivalents in the other languages available on WIPO Pearl.

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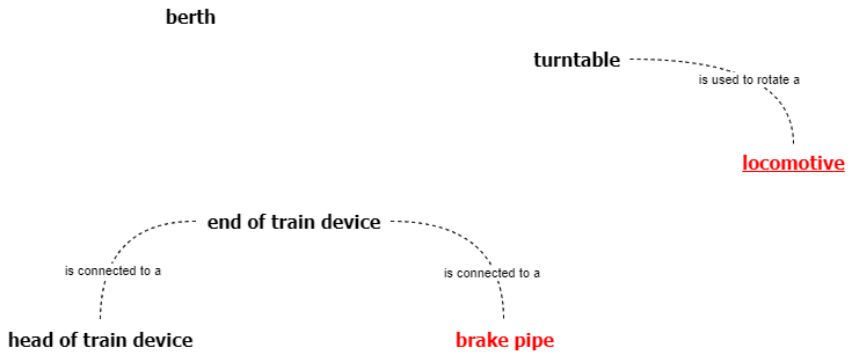
A Conceptual systems

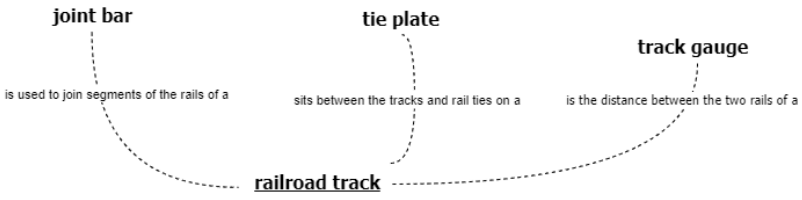
A.1 English

RAIL > Auxiliary equipment

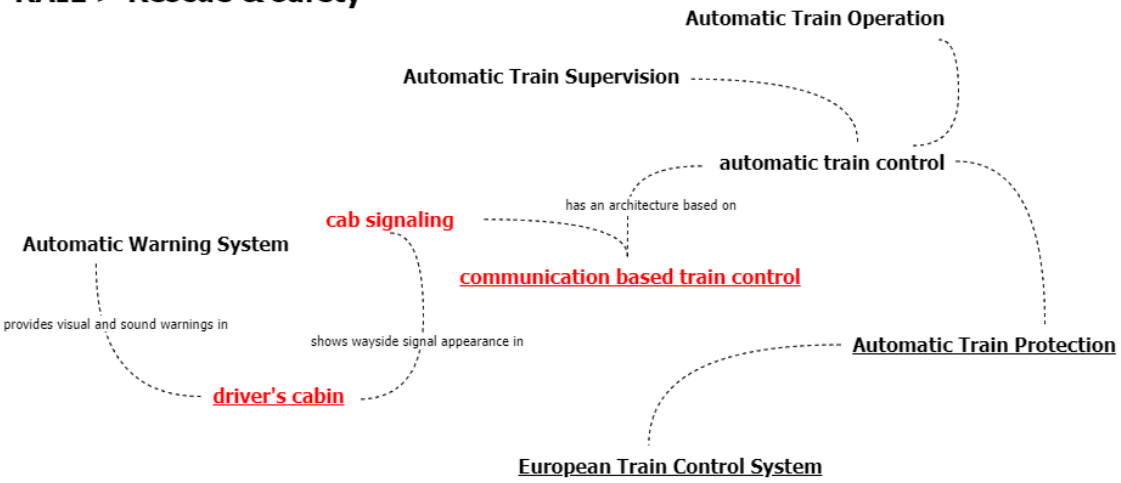


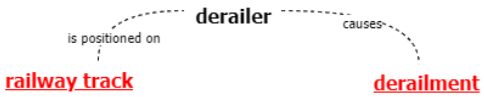
Key
Candidate term
Already in WIPO Pearl
Belongs to another subject field/subfield
Generic or partitive relation →
Associative relation ----------

RAIL > Railway tracks

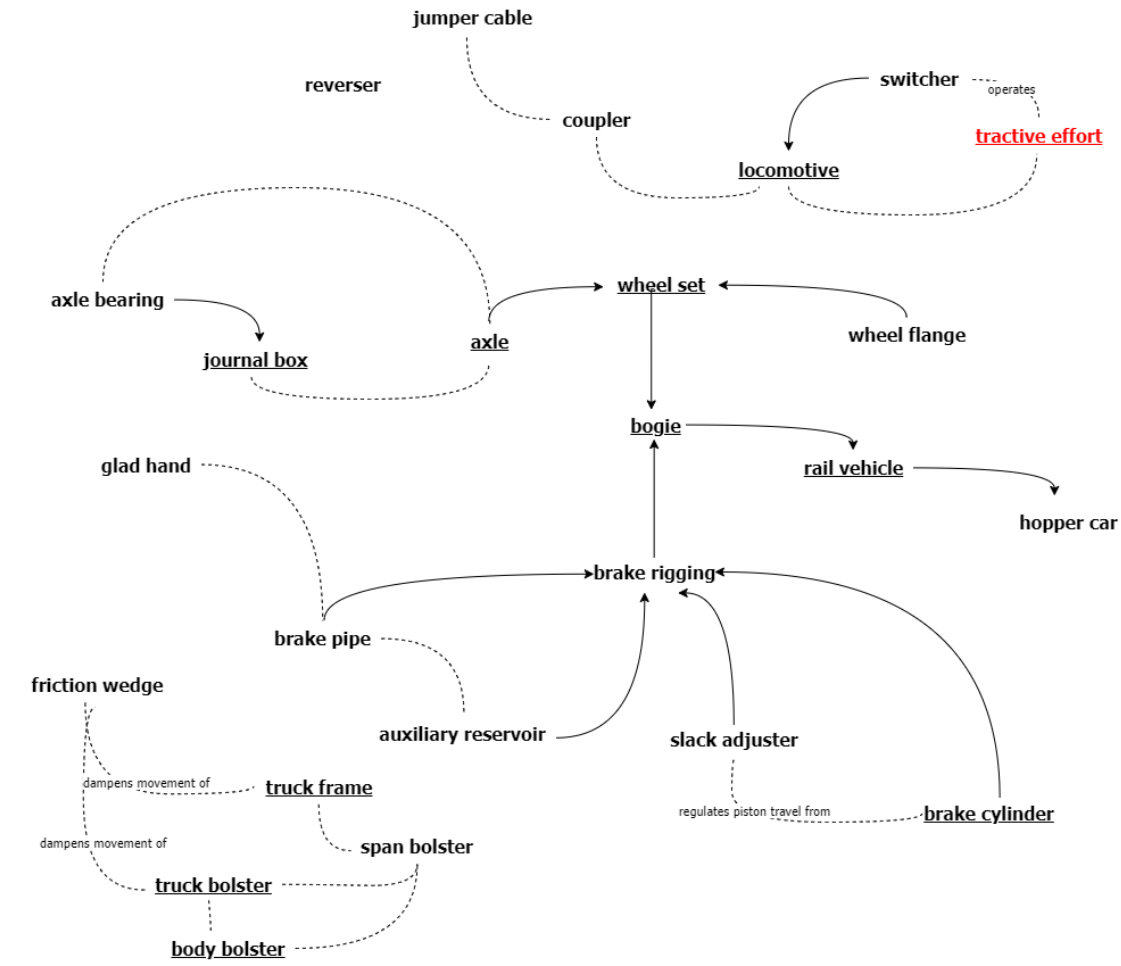


RAIL > Rescue & safety

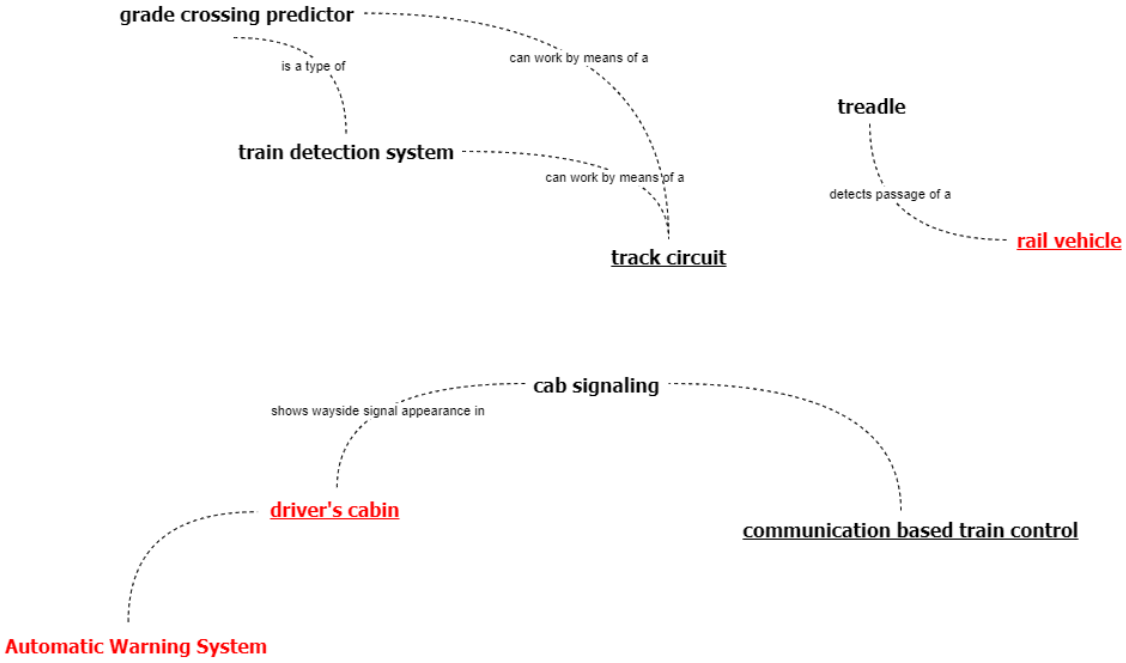




RAIL > Rolling stock

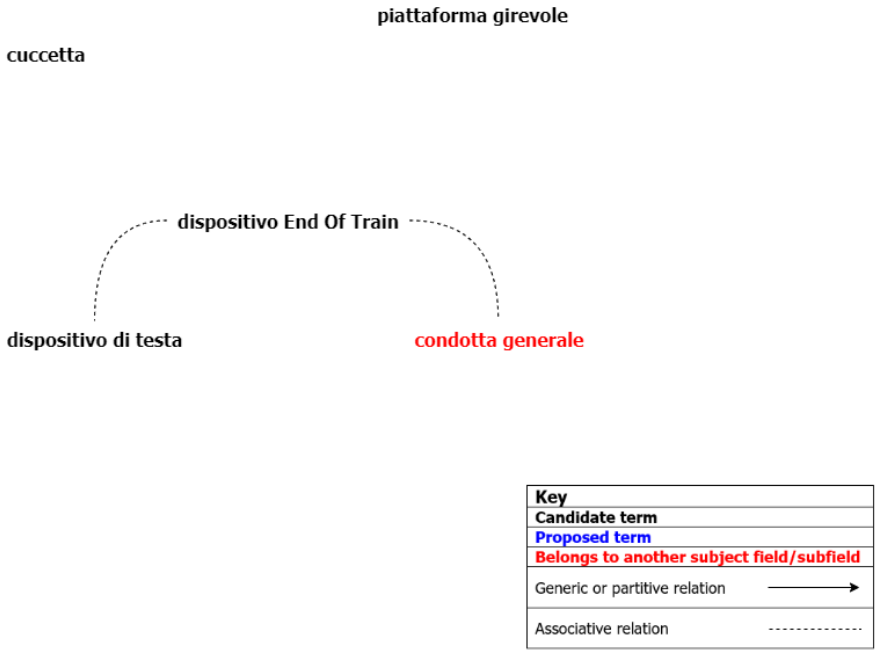


RAIL > Signaling & points



A.2 Italian

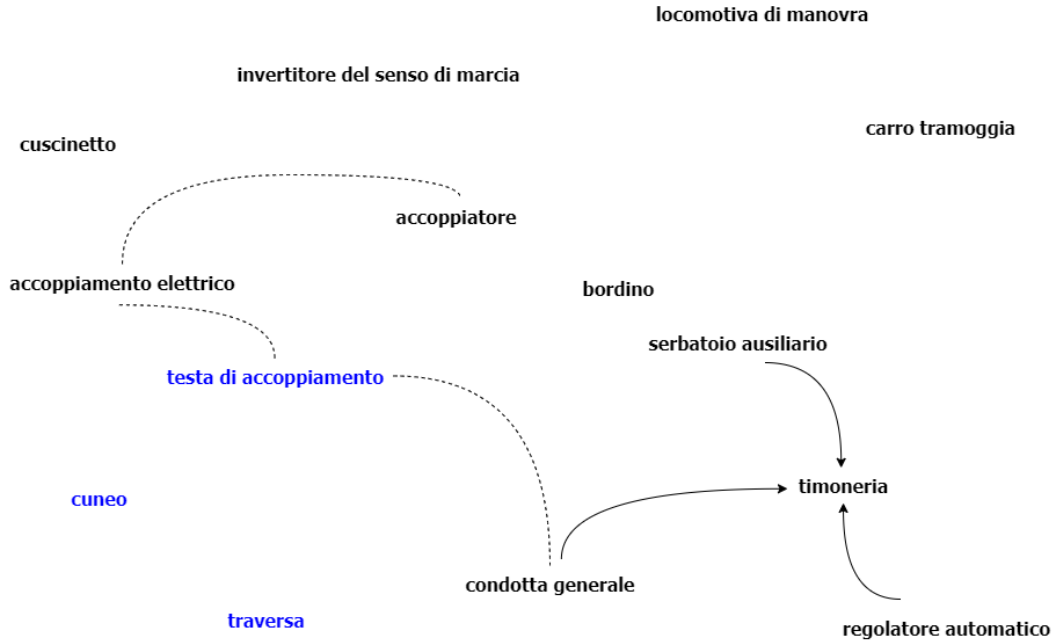
RAIL > Auxiliary equipment



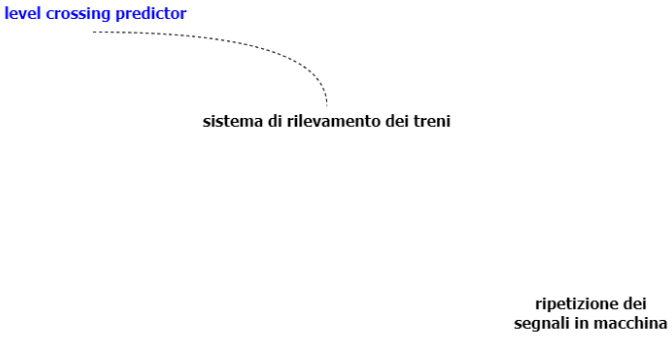
RAIL > Railway tracks

RAIL > Rescue & safety

RAIL > Rolling stock



RAIL > Signaling & points

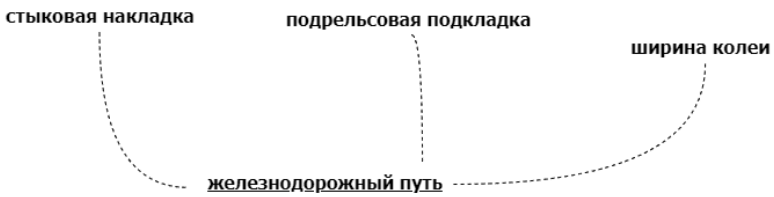


A.3 Russian

RAIL > Auxiliary equipment

Key
Candidate term
Already in WIPO Pearl
Proposed term
Belongs to another subject field/subfield
Generic or partitive relation →
Associative relation ----------

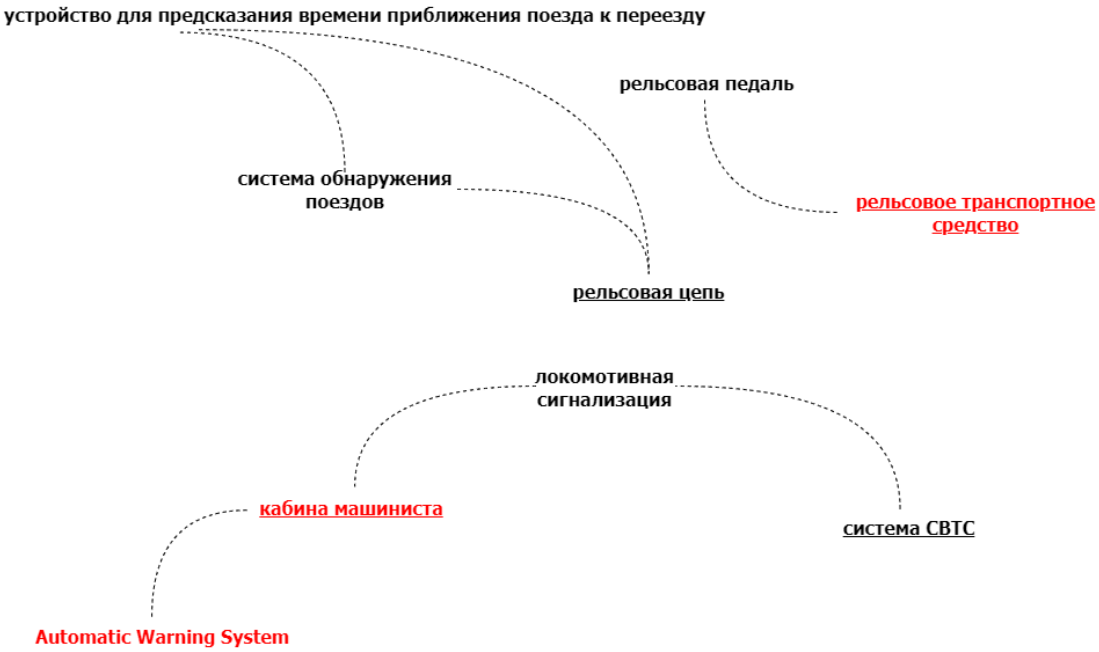
RAIL > Railway tracks



RAIL > Rescue & safety

RAIL > Rolling stock

RAIL > Signaling & points



B Terminological records

Entry number **1**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rescue & safety**
Original Entry Language: **EN**

English

Term **automatic train control**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: For a modern mass transit system, a train of vehicles is typically controlled by an automatic train control or ATC in each of selected control cars which can be in the pairs of A and B cars. An important consideration is the availability of the train of vehicles to move passengers, such that reliability and availability of the train must be high, and since the train control systems have become automated, this includes the availability of that automatic train control. If a train should fail to operate due to the failure of the front ATC, it is necessary to be able to move the train preferably under automatic mode in order to either get it off the roadway track or to keep the train in service such that the roadway track does not jam up with other trains behind the failed train.
Source: US4327415

Term **ATC**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: US4327415

Italian

Term **ATC**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: L'ATC (Automatic Train Control) fornisce in cabina l'indicazione della velocità che il treno deve rispettare in relazione alla libertà e all'integrità della via, alla distanza disponibile, alle caratteristiche del treno, alle caratteristiche del tracciato (permanenti o temporanee) e alle informazioni dell'orario di servizio/prescrizioni.
Source: La trazione ferroviaria. I sistemi a guida vincolata, Marignetti, Fabrizio, Bologna, Società Editrice Esculapio, (2018): 116.

Russian

Term **ATC**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Term Description: abbreviated form
Context: Только в 21 веке родились АТС-системы автоматического контроля поездов (Automatic Train Control). АТС реализуют функцию автоматического управления поездами или АТО-автоматические операции с поездами (Automatic Train Operation), так что поезд движется без вмешательства машиниста, реализуя полностью системы Driverless или системы без участия машиниста.
Source: Пропускная способность и экономика цифровой железной дороги при трансформации сигнализации и управления поездами, Куприяновский, В.П. и др., International Journal of Open Information Technologies, 5(3), (2017): 117-131.
Term Note: This is an acronym in Latin letters, not Cyrillic.

Entry number **2**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rescue & safety**
Original Entry Language: **EN**

English

Term **Automatic Train Operation**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The function of Automatic Train Operation (ATO) is to drive a train automatically between locations as quickly and as smoothly as possible - subject to the constraints imposed by the coasting strategy and the ATP - and to ensure that the train stops accurately at the destination.
Source: US5947423
Term Note: The non-capitalized form, "automatic train operation", also appears in the specialized literature.

Term **ATO**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: US5947423

Italian

Term **ATO**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: L'ATO (Automatic Train Operation) permette la gestione automatica e/o remota della marcia del treno e della frenatura applicando le informazioni fornite dall'ATC (è usato su LZB e ETCS modificato).
Source: La trazione ferroviaria. I sistemi a guida vincolata, Marignetti, Fabrizio, Bologna, Società Editrice Esculapio, (2018): 116.

Russian

Term **ATO**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Term Description: abbreviated form
Context: На базовом уровне АТО обеспечивает автоматическое управление движением поезда между станциями с остановкой на перегоне, если этого требует система сигнализации. Когда этот процесс осуществляется под надзором машиниста, его часто называют полуавтоматическим ведением поезда (Semi-Automatic Train Operation—STO), хотя иногда сохраняется название АТО.
Source: Автоматическое управление движением поезда для пригородных и магистральных линий, Российские железные дороги, Железные дороги мира, 4, (2011): 54-59.
Term Note: This is an acronym in Latin letters, not Cyrillic.

Entry number **3**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rescue & safety**
Original Entry Language: **EN**

English

Term **Automatic Train Supervision**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The operator may choose a route which is stored in train-borne (or carborne) equipment/unit, or in centralized control configurations, the route is chosen remotely by the central dispatcher using Automatic Train Supervision (ATS). The route is communicated to the train using the wireless data communications system. This information includes route number, and other schedule-related information.
Source: WO/2019/169320
Term Note: The non-capitalized form, "automatic train supervision", also appears in the specialized literature.

Term **ATS**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: WO/2019/169320

Italian

Term **ATS**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Le funzioni di controllo sono assicurate da quei sistemi che vanno sotto il nome di ATS (Automatic Train Supervision), essi effettuano l'esercizio ed assicurano i distanziamenti spaziali e temporali dei convogli sulla linea; inoltre, in modalità off-line, consentono la pianificazione dell'esercizio.
Source: Ingegneria dei sistemi ferroviari. Tecnologie, metodi ed applicazioni, Ricci, Stefano et. al., Forlì, Egaf, (2013): 449.

Russian

Term **ATS**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Стандартная архитектура современной CBTC включает следующие основные подсистемы: – ATS в центре управления, позволяющая операторам осуществлять полное управление всеми поездами на линии и в депо; – путевое оборудование с системами блокировки и подсистемами, обеспечивающими управление в каждой зоне на линии или в сети (как правило, включает путевое функциональное оборудование ATP и ATO). Могут иметь централизованную или распределенную архитектуру в зависимости от поставщика. Управление системой осуществляется главным образом с помощью центральной системы ATS, тем не менее могут также предусматриваться локальные подсистемы управления как резерв на случай неисправности центральной системы ATS.
Source: Автоматическое метро: характеристики и перспективы, Сурикова, О.Д. и др., Техника железных дорог, 3(31), (2015): 44-52.

Entry number **4**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rescue & safety**
Original Entry Language: **EN**

English

Term **Automatic Warning System**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: For example the Automatic Warning System (AWS) includes a track mounted, non-contact magnetic inductor placed between rails of a track so that a detector on the train will pass over it and receive an indication of the condition of an approaching signal.
Source: GB2399206
Term Note: The non-capitalized form, "automatic warning system", also appears in the specialized literature.

Term **AWS**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: GB2399206

Italian

Term **Automatic Warning System**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: This term does not appear in other reputable Italian sources, as it specifically pertains to a safety system exclusive to British railways. It is worth noting that Italian railway engineers often do not translate safety and control system names, such as 'Automatic Train Protection' and 'Automatic Train Control.' Therefore, it is likely that the term 'Automatic Warning System' and its acronym would be left untranslated.

Russian

Term **AWS**
Term Status: validated
Usage Label: allowed
Term Type: head term
Context: 19 сентября 1997 года. Скоростной поезд, следовавший на лондонский вокзал Паддингтон, имея неполадки в системе Automatic Warning System (AWS), пропустив запрещающий сигнал и 2 предупреждающих, врезался в товарный состав возле Саутхолла (Southall). 7 погибших, 150 пострадавших. Машинист, Лари Харрисон (Larry Harrison) вначале был объявлен виновным в случившемся, но позднее обвинения сняли. Его работодателя, компанию Great Western Trains, признали виновной и оштрафовали на 1,5 млн фунтов стерлингов. Как выяснило следствие, ключевым фактором, приведшим к катастрофе, было то, что машинист слишком полагался на надежность системы AWS.
Source: Железнодорожные катастрофы и их последствия: на примере Великобритании, Цуриков, А.Н., Альманах современной науки и образования, 5(60), (2012): 161-164.

Entry number **5**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **auxiliary reservoir**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: In accordance with teachings of the present disclosure, air may be accumulated in one or more auxiliary reservoirs or air reservoirs associated with a railroad car while charging a respective air brake system associated with the railroad car. Air pressure in the respective air brake system may be allowed to reach a predetermined value prior to supplying air to one or more associated air reservoirs or auxiliary reservoirs. Once the predetermined value of air pressure in the respective brake system is reached, a portion of the air flowing through an associated air brake line (sometimes referred to as "excess air") may be bled from the respective air brake system. Such air from the respective air brake system may be accumulated in one or more auxiliary reservoirs without compromising performance of the respective air brake safety system. Each auxiliary reservoir may be adapted to supply air to an auxiliary cylinder or other types of pneumatic equipment or components on the associated railroad car.
Source: US20110006592

Italian

Term **serbatoio ausiliario**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Su ciascun veicolo V1, V2, V3,...Vn è disposto un gruppo di frenatura includente, in modo per sé noto, un distributore 18 dotato, in modo per sé noto, di almeno una camera acceleratrice e collegato pneumaticamente ad un serbatoio ausiliario 20 e ad un attuatore 22 collegato meccanicamente alla timoneria di comando del freno.
Source: ITTO980560A1

Russian

Term **запасной резервуар**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Запасной резервуар содержит запас сжатого воздуха, пополняемый из тормозной магистрали через обратный клапан во время отпуска тормозов. В процессе торможения запасной резервуар сообщается тормозным цилиндром. Обратный клапан служит для пропуска сжатого воздуха только в одном направлении: из тормозной магистрали в запасной резервуар.
Source: RU0000157477

Entry number **6**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **axle bearing**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Some of the other elements of a bogie include the wheel sets 12 and 14, one set of which includes a pair of wheels 16 (and 18 not shown) fitted at each end of an axle 20. On the free ends of the axle are located bearing assemblies (axle bearings) 22 (and 24 not shown) in which the axle rotates with the least possible friction.
Source: NZ576711

Term **wheel axle bearing**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Term Description: full form
Context: The present invention relates to an improved side bearing for mounting on a railway car truck bolster that provides improved control to limit rock and roll characteristics of the railway car in service. As shown in FIG. 1, a typical railway freight car truck 64 includes a pair of side frames 30, 32 supported on axle-wheel sets 34, 36. Bolster 38 extends between and is supported on springs 40 mounted on side frames 30, 32. Bolster center plate 28 includes a central opening 42. Side bearing pads 60 are provided laterally to each side of the center plate 28 on bolster 38. Side frames 30, 232 comprise a top member 44, compression member 46, tension member 48, column 50, pedestal 54, pedestal roof 56, wheel axle bearings 58, and bearing adapter 62. Side bearings are commonly used on railroad car trucks. Such side bearings are typically located on the truck bolster such as on side bearing pads 60, but may be located elsewhere on the bolster. Bolster 38 and side frames 30, 32 are usually unitary cast steel structures.
Source: US09555818

Italian

Term **cuscinetto**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Come noto, una boccola include un cuscinetto montato sull'assale annegato nel grasso che a causa dell'usura rischia di riscaldarsi in modo anomalo arrivando a causare non solo il danneggiamento della boccola ma anche, come conseguenza di ciò, la rottura dell'asse con conseguente deragliamento treno.
Source: IT201600111758

Russian

Term **буксовый подшипник**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Источниками входной информации для систем диагностики служат параметры, несущие информацию о техническом состоянии объекта. Эти параметры должны прямо или косвенно отражать состояние объекта. Одним из основных элементов, влияющих на надёжность, являются буксовые узлы и их главный узел — буксовые подшипники.
Source: Вероятностная модель надежности подвижной единицы в системе технического обслуживания и ремонта вагонов, Ахтулов, А.Л. и др., Омский научный вестник, 2(120), (2013): 70-73.

Entry number **7**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **ROAD (Road Vehicle & Automotive Engineering)**
Subfield: **Caravans & trailers**
Original Entry Language: **EN**

English

Term **berth**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: In various vehicles, especially in trucks and/or commercial vehicles, there is often a need to provide one or more sleeping area within the vehicle. By way of example, vehicles can often include one or more sleeper bunks or berths upon which one member of a driving team can rest while the other operates the vehicle, or which allows both members of the team to rest when parking the vehicle in a suitable rest area or stop.
Source: US20090001760

Italian

Term **cuccetta**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: I convogli per lunghe percorrenze, il cui percorso comprende non solo le ore diurne ma anche le notturne, hanno carrozze con cuccette o con comparti letti.
Source: Costruzione del veicolo ferroviario. Elementi introduttivi ed esperienze di progetto, Panagin, Romano, Roma, Collegio Ingegneri Ferroviari Italiani, (2006): 19.

Russian

Term **спальная полка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Спальная полка может занимать два положения: поднятое и горизонтальное. В поднятом положении полки мягкая подушка, установленная на ней, образует с сидением диван. Для сна спальная полка опускается в горизонтальное положение таким образом, что сверху полки оказывается матрац, а спинка дивана укладывается на сидение. Однако, данное спальное место недостаточно удобно для сидения пассажиров, т.к. не предусматривает установку подлокотников, а также затрудняет пользование рундуком из-за жесткого крепления на нем сидения.
Source: RU0000098381

Entry number **8**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **brake pipe**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Brake pipe 10 may serve at least two purposes. First, air travels through brake pipe 10 to accumulate in brake reservoir 14 for each individual railroad car. Second, brake pipe 10 facilitates transmission of a pressure drop that activates respective brakes associated with each railroad car.
Source: US20110006592

Italian

Term **condotta generale**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Quando si impartisce un comando di frenatura scaricando la condotta generale tramite il rubinetto di comando 16 si produce una depressione che parte dal rubinetto 16 e si propaga lungo la condotta generale 12 fino a raggiungere l'ultimo veicolo del convoglio.
Source: ITTO980560A1

Russian

Term **тормозная магистраль**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: [Т]ормозная магистраль 10 соединяется с трубопроводом, на котором установлен запорный клапан 21, который закрывается. С другой стороны этот клапан находится под воздействием кривошипа 22, который при движении поезда все время находится в качательном движении и, следовательно, будет производить периодическое открывание этого клапана и выпуск воздуха из тормозной магистрали в атмосферу. Этим устройством достигается плавное торможение поезда, так как выпуск каждой дозы воздуха клапаном 21 в атмосферу приводит к уменьшению скорости поезда, и, следовательно, к замедлению движения кривошипа 22, т. е. к более медленным открываниям и закрываниям клапана.
Source: SU00039203

Entry number **9**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **brake rigging**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The brake rigging of railroad cars conventionally includes cylinder and dead levers swingably mounted under the car for actuation by a brake cylinder, with the levers being operably connected to the truck wheel brake mechanisms through linkages that include the familiar brake rod.
Source: US4079818

Italian

Term **timoneria**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: I cilindri freno non agiscono direttamente sugli elementi frenanti ma azionano un'opportuna catena cinematica, chiamata timoneria, che trasmette, adeguatamente moltiplicato, lo sforzo di frenatura dal cilindro freno all'elemento ad attrito. Nella configurazione più semplice (fig. 1.14) si usa una singola timoneria ad alto rapporto di moltiplicazione che ripartisce su tutti i freni del veicolo la forza derivante da un solo cilindro freno montato sul rotabile. Nelle locomotive si preferisce però utilizzare un cilindro per ognuno dei freni del veicolo, poiché con questa configurazione si possono creare catene cinematiche strutturalmente più semplici (e meno ingombranti) e con rendimenti più elevati (fig. 1.15).
Source: Modellazione multibody di convogli ferroviari per lo studio della dinamica longitudinale, Auciello, Jury (tesi di dottorato), Università degli Studi di Firenze, 2008: 15.

Term **leveraggi del freno**
Term Status: *candidate*
Term Reliability: *allowed*
Usage Label: *allowed*
Term Type: synonym
Context: n
Source: n

Russian

Term **тормозная рычажная передача**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Тормозная рычажная передача содержит тормозной цилиндр (1), шарнирно соединенный с плечом горизонтального коромысла (3), монтажной осью (3.1) в средней своей части горизонтальное коромысло шарнирно связано с несущим винтом (4), который используется в качестве кронштейна «мертвой точки».
Source: RU208481

Entry number **10**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Signaling & points**
Original Entry Language: **EN**

English

Term **cab signaling**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Further, the system and technique may be used in track circuit applications in which the transmitter and receiver are located at spaced locations along the rails to detect the presence of a train in the interval between the transmitter and receiver. They may also be used for cab signaling in which the transmitter is located along the rail and the receiver is located on-board a locomotive for transmitting information from wayside to the locomotive, such as signal aspect information.
Source: US20040181321

Term **cab signalling**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: geographical variant
Variant Code: en-GB
Context: Both System A and System B inform the train driver 4 him how far and how fast the train is authorized to proceed, as determined by interlocking equipment 5. System A presents this information to the driver 4 from a display (not shown) within the driving cab, and this is known as 'cab signalling'. System B presents the information to the driver 4 from components of its trackside equipment 3B, known as 'signals'. System B may supplement this information from signals with information presented within the driving cab.
Source: WO/2013/153396

Italian

Term **ripetizione dei segnali in macchina**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Il blocco a circuito di binario, pur essendo più costoso del blocco contaassi, presenta il vantaggio di consentire, oltre al controllo libero-occupato, anche il controllo della continuità dei binari e la ripetizione dei segnali in macchina attraverso l'invio lungo i binari di correnti "codificate"; per questi vantaggi, è utilizzato nelle linee a più intensa circolazione e maggiori velocità (V maggiore di 150 km/h).
Source: Lineamenti di infrastrutture ferroviarie, Policicchio, Franco, Firenze, Firenze University Press, (2007): 150-151.

Russian

Term **локомотивная сигнализация**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Системы локомотивной сигнализации разделяют на точечные и непрерывные. Точечные решения применялись ранее, и информация с путевого оборудования на локомотив поступала в определенные моменты пересечения поездом передающих устройств; в непрерывных системах локомотивной сигнализации информация постоянно передается с рельсовой линии на приемное оборудование локомотива посредством индуктивной связи по пути следования состава.
Source: Повышение информативности системы интервального регулирования движения поездов АЛС-ЕН путем использования модульно взвешенного кода с суммированием, Никитин, Д.А. и др., Автоматика на транспорте, 3(4), (2017): 526-542.

Entry number **11**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **coupler**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Fig. 1 shows a side view of a bulk material rail way wagon. As depicted, the wagon 1 includes a bulk material transport container 2 which is positioned and supported atop an elongate railway wagon underframe 3. The underframe 3 is connected to two bogies 4 located near respective ends 5, 6 of the wagon underframe 3. The underframe includes a centre sill 7 and the bogies 4 including wheel sets 8 interconnected by side frames 9 and a bolster 10 which extends from, and is mounted to, the centre sill 7 via a centreplate 1 1 (Fig. 3). Couplers (not illustrated) are mounted to the centre sill 7 at opposite ends of the wagon 1 to allow for interconnection of wagons and/or connection of the wagon to a locomotive.
Source: WO/2012/135898

Term **coupling**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: In one aspect, the present disclosure is directed to an adapter for a power system having a first powertrain and a second powertrain joined together by a coupling. The adapter may include a generally cylindrical body having a central bore formed therein that is configured to receive a shaft of the first powertrain, and splines formed at an end of the central bore.
Source: WO/2016/094041

Italian

Term **accoppiatore**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: L'accoppiatore può effettuare le seguenti operazioni: - accoppiamento meccanico automatico per semplice accostamento delle motrici. - accoppiamento di due condotte pneumatiche, oltre quella per il comando del disaccoppiamento. - accoppiamento di circuiti elettrici a bassa tensione c.c. e di 3 circuiti a 380 V c.a. - disaccoppiamento con comando pneumatico a distanza. - disaccoppiamento di emergenza, con comanda a terra.
Source: Costruzione del veicolo ferroviario. Elementi introduttivi ed esperienze di progetto, Panagin, Giorgio, Roma, CIFI, (2006): 528.

Russian

Term **сцепное устройство**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: synonym
Context: Из известных устройств наиболее близким по технической сущности является маневровое устройство для вагонов, содержащее установленный на самоходной платформе вилочный погрузчик, передние колеса которого размещены на двух парах кинематически связанных посредством валов и редукторов приводных катков с приводными колесами, в передней части которой на стойке смонтировано сцепное устройство для сцепления с автосцепкой вагона, а в задней ее части установлены откидные трапы для заезда и съезда погрузчика (SU 1705163, кл. B61J 3/06, 1989 г.).
Source: RU02405697

Term **сцепка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: В качестве «любых других конструктивных элементов состава поезда» для его позиционирования кроме целевой колесной пары могут быть использованы, например, такие элементы, как сцепки между вагонами, сцепка между вагоном и локомотивом, дверные проемы пассажирских вагонов, кодовые бортовые датчики КБД-2 для идентификации подвижного состава.
Source: RU0002751589

Entry number **12**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rescue & safety**
Original Entry Language: **EN**

English

Term **derailer**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: In the overwhelming number of dark territory switches, the switch is located on a siding where railroad cars are often uncoupled from a train and left parked at a point on the siding such that a train on the main line can safely pass, which point is called the clearance point. To prevent the uncoupled cars from rolling onto, or too close to, the mainline the handbrakes on the cars are set and a derail is engaged. A derail, sometimes referred to as a derailer, is a device used to prevent the fouling (blocking or compromising) of a railroad track, typically a main line. Undetected such a blocking when undetected by a train crew can lead to a collision, property damage and even death. The derail will also prevent a collision with anything present on the track, such as a person, a train or a fallen branch by unauthorized movements of trains or unattended rolling stock. A derail works by derailing the equipment as it rolls over or through it. Although accidental derailment is damaging to equipment and track, and requires considerable time and expense to remedy, derails are used in situations where there is a risk of greater damage to equipment, injury or death if the equipment were allowed to roll past the clearance point into a zone of danger.
Source: WO/2020/018457

Italian

Term **deragliatore**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: The concept expressed by the term does not exist in Italian language, as 'derailers' are not in use in railways in Italy.

Russian

Term **устройство для сбрасывания подвижного состава с рельсов**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Из уровня техники известно устройство для сбрасывания подвижного состава с рельсов, которое содержит сбрасывающий башмак с накатной полкой, ограниченной направляющим гребнем. Сбрасывающий башмак установлен на одном из ходовых рельсов с возможностью поступательного перемещения перпендикулярно рельсу в направляющих, жестко закрепленных на основании, и выполнен с опорной плитой, установленной в указанных направляющих и имеющей пару разнесенных в ее поперечном направлении упоров, расположенных с возможностью взаимодействия с поворотными в направлении рельса фиксаторами, смонтированными на основании, а накатная полка башмака выполнена с участком, расположенным ниже уровня головки рельса со стороны подхода подвижного состава
Source: RU0000190330

Entry number **13**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Auxiliary equipment**
Original Entry Language: **EN**

English

Term **end-of-train device**
- Term Status: *validated*
- Term Reliability: *3*
- Usage Label: *allowed*
- Term Type: head term
- Context: End-of-train devices (ETDs) are widely used, in lieu of cabooses, for signaling and monitoring purposes in trains that travel on railroads. Information monitored by an ETD may include the air pressure of a brake line, battery condition, as well as train movement.
- Source: WO/2016/054495
- Term Note: Also spelled "end of train device".

Term **ETD**
- Term Status: *validated*
- Term Reliability: *3*
- Usage Label: *allowed*
- Term Type: synonym
- Term Description: abbreviated form
- Source: WO/2016/054495

Term **end-of-train unit**
- Term Status: *validated*
- Term Reliability: *3*
- Usage Label: *allowed*
- Term Type: synonym
- Context: End-of-train (EOT) units coupled to the rear railroad car of a train are used extensively by railroads, and are configured to monitor air pressure in the air brake pipe, which runs the length of the train, as well as other parameters, such as motion. Mounted to the last railcar, the EOT unit is normally coupled to the brake pipe by means of a hose and a glad hand.
- Source: US20110251742

Term **flashing rear-end device**
- Term Status: *validated*
- Term Reliability: *3*
- Usage Label: *allowed*
- Term Type: synonym
- Context: Train consists may be configured with one or more locomotives and one or more cars. Various train lines are owned and operated by different railroad companies. Each railroad company uses a selected locomotive-train operating control system for controlling the trains of its fleet. An end of train device (ETD) sometimes referred to as an (EOT), flashing rear-end device (FRED) or sense and brake unit (SBU) is an electronic device mounted on the end of freight trains in lieu of a caboose. They are divided into three categories: "dumb" units, which only provide a visible indication of the rear of the train with a flashing red taillight; "average intelligence" units with a brake pipe pressure gauge; and "smart" units, which send back data to the crew in the locomotive via radio-based telemetry.
- Source: CA3051352

Term **FRED**
- Term Status: *candidate*
- Usage Label: *allowed*
- Term Type: synonym
- Term Description: abbreviated form
- Source: CA3051352

Term **EOT unit**
- Term Status: *validated*
- Term Reliability: *3*
- Usage Label: *allowed*
- Term Type: synonym
- Context: When the train includes an EOT unit, the EOT unit is positioned at the end of the train opposite the location of the pressure regulator and adapted for obtaining a pressure measurement from the end of the brake pipe. The EOT unit is also able to communicate this measurement to an operator in the locomotive controlling the pressure regulator, such as to allow the latter to monitor the brake pipe pressure at the end of the train.
- Source: CA2778002

Italian

Term **dispositivo End Of Train**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Si riportano anche, nella medesima tabella, le stesse quantità riferite al treno accoppiato dotato di dispositivo End Of Train (EOT), vale a dire di una valvola pneumatica posta in coda al treno, che si apre non appena "avverte" una riduzione di pressione, determinando un più repentino svuotamento della condotta generale e un'azione frenante più sincrona tra i diversi carri e, di conseguenza, una generale riduzione sia delle forze massime longitudinali sia degli spazi d'arresto del treno.
Source: Performance di frenatura di un treno merci con trazione distribuita, Cantone, Luciano et al., (Atto di convegno), Università degli Studi di Roma "Tor Vergata", settembre 2012: 3.

Term **valvola EOT**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: Le valvole EOT (acronimo di End Of Train) sono dei dispositivi di scarica della condotta che vengono posti in coda al treno. Il loro azionamento può essere pneumatico o elettrico; ovviamente nei treni merci è possibile utilizzare solamente dispositivi puramente pneumatici non essendo elettrificato il convoglio. La possibilità di un controllo radio per il funzionamento di questi dispositivi deve tener conto delle restrizioni in termini di sicurezza che di fatto ne vietano l'utilizzo; basti pensare alla possibile perdita del segnale in galleria. Entrambi questi dispositivi aiutano la frenatura del convoglio, il loro utilizzo può diventare fondamentale per uniformare l'azione frenante su lunghi convogli ferroviari e di conseguenza limitare le forze di compressione che nascono sui respingenti dei veicoli.
Source: Crescentini, Emiliano, (Tesi di dottorato), Università degli Studi di Roma "Tor Vergata", maggio 2008: 33.

Term **EOT**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: Performance di frenatura di un treno merci con trazione distribuita, Cantone, Luciano et al., (Atto di convegno), Università degli Studi di Roma "Tor Vergata", settembre 2012: 3.

Russian

Term **блок хвостового вагона**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Для разъединения поезда может потребоваться только притормаживание ведомого состава, что можно выполнить достаточно быстро. Однако при этом возникают затруднения в синхронном управлении таких составов. Блок хвостового вагона (БХВ), имеющий функции: а) измерения значения давления в тормозной магистрали хвостового вагона, б) определения начала торможения, в) определения величины разрядки тормозной магистрали, способствует вождению таких составов. Для стандартного БХВ просто обязательно наличие приемопередатчика для передачи указанных данных из-за его предназначения.
Source: RU0002453457

Term **БХВ**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: synonym
Term Description: abbreviated form
Source: RU0002453457

Entry number **14**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **wheel flange**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: In the operation of railroads, it has long been the practice to apply grease or similar gel-like lubricants to the sides of the rail at curves, turn-outs, switches and, in some cases, to the sections of track immediately before a switch. Such lubricants have been and still are applied to the inside sides of the rail head at these locations to reduce the friction which naturally occurs as a train's wheels, particularly the wheel flanges, contact the sides of the rail. The resulting reduction in friction reduces wear on both the rail itself and the wheel flanges and contributes to increased fuel consumption in the locomotion of the train. When such lubricant is dispensed on the rail immediately preceding a switch, the movement of the train tends to move the lubricant into the area of the switch so as to reduce the friction on the rail sections and wheel flanges as the train passes over the switch.
Source: US5641037

Term **flange**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: Since the flange of the rail wheel is primarily for locating the wheel in the correct position on the rail, rather than providing load-bearing capacity, it is preferred that the inner and outer wheel body portions be engaged with one another at the flange, thereby resulting in a wheel which has reduced rates of failure. Preferably, the radial support wall may form a brake drum for the rail wheel.
Source: GB2584884

Italian

Term **bordino**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Una ruota ferroviaria, in accordo all'arte nota, è mostrata in figura (1); essa comprende un mozzo (a), un disco (b) e un cerchione (c). Il cerchione ha forma troncoconica, per limitare gli strisciamenti in curva, con due diverse pendenze, 1/10 e 1/20, e un bordino per ridurre il rischio di deragliamento.
Source: ITUB20155152

Russian

Term **гребень**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Гребень — (реборда) направляет движение колеса по рельсовой колее и предохраняет колесную пару от схода с рельсов.
Source: Тепловозы. Основная теория и конструкция, Учебник для техникумов, Кузьмич, В.Д. и др., Москва, Транспорт, (1991): 289.

Entry number **15**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **friction wedge**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Friction wedges are used in railroad car trucks to dampen movement of the bolster with respect to the side frame of the railroad car truck. Friction wedges are often triangular-shaped such that the friction wedge can act as a wedge between an inclined surface of the bolster and a generally vertical wear plate on a column of the side frame. The friction wedge is wedged into engagement between the bolster and the column of the side frame by a suspension spring. The frictional forces generated between the friction wedge and a wear plate on the side frame provides dampening of bolster movement.
Source: AU2018386086

Italian

Term **cuneo**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Context: Tali cunei costituiscono pertanto il principale componente responsabile della caratteristica smorzante della sospensione: durante il suo funzionamento, il moto relativo che si genera in corrispondenza delle superfici di contatto dei cunei con la traversa e le pareti del telaio laterale comporta lo sviluppo delle forze di attrito necessarie alla dissipazione energetica. Tale aspetto influenza considerevolmente il comportamento dinamico del vagone merci, contribuendo a garantire la stabilità dello stesso.
Source: Analisi dinamica non lineare di un meccanismo di sospensione per carrelli ferroviari con smorzatori per attrito, Federico, Riccardo, (Tesi di laurea magistrale), Politecnico di Torino, 2021, 12-13.

Russian

Term **фрикционный клин**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Фрикционный клин содержит полый корпус с опорной площадкой и выступом опорной площадки, боковые стенки, вертикальную стенку с выступом вниз, верхнюю и переднюю стенки, сопряженные наклонной стенкой, имеющей рабочую поверхность, и внутреннее ребро.
Source: RU0000198003

Entry number **16**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **glad hand**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: In a railway car coupler system, a supporting device is used for suspending the glad hand of an air brake hose assembly from the couplers of railway vehicles. AAR standards specify a minimum distance between the ground and the glad hand fitting, so that the straps are made adjustable between a length of 16 inches and 22 inches. Conventionally, the supporting device, also called an air brake hose support or hose strap, was a metal chain whereby, one end of the chain could be connected to a fitting on the glad hand on the free end of the air hose and the other end could be connected to a fitting on the coupler of the railway vehicle.
Source: CA2774425
Term Note: Also spelled "gladhand" or "glad-hand".

Term **glad hand connector**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: In a conventional railroad train braking system, each railway vehicle is provided with a brake pipe line which extends along the length of the vehicle. The pipe line is connected to the brake cylinders via reservoirs and valves. Each end of the brake pipe is coupled to a "glad hand" connector by an angle or stop cock and a flexible hose. The glad hand connectors are fastened together to form a continuous pipe line stretching from the head locomotive to the last train car. Each flexible hose has a glad hand, acting as a coupling member, at each end for detachably connecting the hose sections of adjacent cars together when joining additional individual railroad cars.
Source: US20100237569

Term **air brake hose coupler**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: Air brake hose couplers, typically referred to as gladhand connectors, have two interlocking members fitted to the hoses that supply pressurized air from a locomotive to the railway air brakes of the railroad cars of a train and then coupled together to join the hoses together.
Source: US20180265102

Italian

Term **testa di accoppiamento**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: In Italian, there is no distinction between a 'glad hand' of an air brake hose and other types of couplers. A more generic term was found in an official RFI (Rete Ferroviaria Italiana) document: "I manovratori, per accoppiare la condotta generale del freno continuo di due veicoli attigui, devono sollevare in alto i due tubi flessibili, centrare le teste di accoppiamento poste all'estremità libera dei due tubi l'una contro l'altra, in modo che il risalto dell'una venga ad infilarsi nell'apposito incavo dell'altra, e farle girare l'una rispetto all'altra abbassando contemporaneamente i due tubi, finché questi vengano ad essere disposti secondo una curva regolare." (source: 'Istruzione per il servizio dei manovratori in uso sull'Infrastruttura Ferroviaria Nazionale.' available at: https://epodweb.rfi.it/Modules/Documenti/WFInfoScheda.aspx?q=TmYx%2FHSR%2BxzlR1uwbDQLyA%3D%3D)

Russian

Term **соединительный рукав**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Железнодорожный подвижной состав состоит из отдельных подвижных единиц (локомотивов, вагонов), и каждая единица содержит на торцах трубы воздушной тормозной магистрали концевые краны, на выходе которых навинчены соединительные рукава, на свободных концах которых устанавливаются соединительные головки. При сцепке единиц состава между собой соединение воздушной магистрали воедино осуществляется с помощью указанных соединительных головок двух соединяемых рукавов, т.е. соединительные рукава используются при работе попарно.
Source: RU02338651

Entry number **17**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Signaling & points**
Original Entry Language: **EN**

English

Term **grade crossing predictor**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Railroad signal control equipment includes for example a constant warning time device, also referred to as a grade crossing predictor (GCP) in the U.S. or a level crossing predictor in the U.K., which is an electronic device that is connected to rails of a railroad track and is configured to detect the presence of an approaching train and determine its speed and distance from a crossing, i.e., a location at which the tracks cross a road, sidewalk or other surface used by moving objects. The constant warning time device will use this information to generate a constant warning time signal for a crossing warning device.
Source: US20230264726

Term **GCP**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: abbreviated form
Source: US20230264726

Term **level crossing predictor**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: geographical variant
Variant Code: en-GB
Context: A grade crossing predictor (often referred to as a crossing predictor in the U.S., or a level crossing predictor in the U.K.) is an electronic device that is connected to the rails of a railroad track and is configured to detect the presence of an approaching train and determine its speed and distance from a crossing (i.e., a location at which the tracks cross a road, sidewalk or other surface used by moving objects). The grade crossing predictor will use this information to generate a constant warning time signal for controlling a crossing warning device.
Source: US20210146980

Italian

Term **level crossing predictor**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: Level crossing prediction systems are not in use in Italian railways, and no suitable equivalent was found in authoritative sources. In one publication, 'Ingegneria dei sistemi ferroviari. Tecnologie, metodi ed applicazioni, Ricci, Stefano et al., Forlì, Egaf, (2013): 281.', a possible equivalent was found untranslated, even though it referred to a specific system in use in the United States.

Russian

Term **устройство для предсказания времени приближения поезда к переезду**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Известен способ управления закрытием переезда (патент US 8297558, 30.10.2012), который заключается в использовании устройства для предсказания времени приближения поезда к переезду. Данное решение построено на базе системы интервального регулирования поездов, однако, скорость поезда определяется исключительно по показанию светофора, имеется ввиду цветовое показание загоревшейся лампы, зеленый, желтый, красный и различные комбинации в зависимости от типа системы интервального регулирования движения поездов и проходного светофора.
Source: RU0000164975

Entry number **18**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Auxiliary equipment**
Original Entry Language: **EN**

English

Term **head of train device**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: There is a growing movement to transport more material by rail as production of goods reaches capacity. Additional and improved safety systems are required to solve problems in current systems. Thus, there are efforts to improve the safety of systems used to determine the health of a train, including end of train devices. An end of train device is generally armed by a railway engineer to a head of train device to provide a safe and reliable connection between the locomotive and the end of the train.
Source: CA3047274
Term Note: Also spelled "head-of-train device".

Term **head of train unit**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: Railroads (AAR), two-way EOT systems typically feature a locomotive control unit (LCU) 51 in the lead locomotive 2 and an EOT unit 55 connected to the brake pipe typically on the last railcar in the train. Also referred to as a head of train (HOT) unit, the LCU is mounted to the train operator's console in the locomotive 2.
Source: CA2251316
Term Note: Also spelled 'head-of-train unit.'

Term **HOT unit**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: By radio signals, the EOT unit 55 transmits to the HOT unit 51 data pertaining to the pressure in the brake pipe and the motion of the last railcar. To accomplish this, the EOT unit 55 includes a pressure transducer to monitor brake pipe pressure, a motion sensor to sense movement of the last railcar, a microprocessor unit to control the overall operation of these components and a transceiver (i.e., combination transmitter and receiver) that the microprocessor unit uses to transmit this last railcar data. The HOT unit 51 includes a primary display, a transceiver to receive transmissions from the EOT unit and a microprocessor unit.
Source: CA2251316

Italian

Term **dispositivo di testa**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Con l'intento di verificare i risultati forniti dal modello di condotta generale in presenza di più input di frenata, in Figura 4.11 si riporta l'andamento della pressione in condotta generale per il treno 1200m con distributori attivi in cui sono presenti due diversi dispositivi di scarica della condotta generale e, precisamente, il gruppo Eurotrol in testa e l'EOT in coda; l'EOT viene attivato 0.1 s dopo il dispositivo di testa.
Source: Sviluppo di un codice di simulazione dinamica per lo studio di treni merci di futura generazione, Crescentini, Emiliano, (Tesi di dottorato), Università degli Studi di Roma "Tor Vergata", maggio 2008: 121.

Russian

Term **БИВ**
Term Status: candidate
Usage Label: proposed term
Term Type: head term
Context: При включении источника питания 6 электрическое питание поступило на радиомодем РМ-Л 5 и РЛТ 8. Включившись, РЛТ 8 производит внутренний тест и выводит результат теста на БИВ 4. Машинист локомотива с помощью клавиатуры БИВ 4 вводит в систему СУТП необходимую служебную информацию. РЛТ 8 поддерживает в ТМ 18 давление воздуха, заданное машинистом. Машинист, произведя процедуру регистрации, вводит в БИВ 4 индивидуальный номер БХВ 12, после получения данного номера РЛТ 8 передает на радиомодем РМ-Л 5 пакет информации, содержащий запрос для БХВ 12 с данным индивидуальным номером.
Source: RU02385247

Entry number **19**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **hopper car**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Hopper cars are used to haul coal, grain, phosphate and other commodities. After hopper cars are positioned over an unloading pit, the discharge doors of the hoppers are rotated to an open position, allowing the material within the hopper car to be emptied into the pit. There are several methods available for opening and closing the hopper doors.
Source: US20070175357
Term Note: Term also used in Australia and Canada.

Term **hopper railcar**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: A hopper railcar, or hopper car, is a railcar used to transport loose bulk commodities such as grain, coal, minerals, fertilizers, cement, etc. The hopper car interior is typically divided into pockets or hoppers with doors on the bottom of each pocket to empty cargo by the force of gravity, making for quick and effective unloading. The discharge doors do not prevent the use of a rotary unloader that pivots the entire car, but the discharge doors on the bottom do not require the use of such a rotary unloader.
Source: CA2993403

Term **hopper wagon**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: geographical variant
Variant Code: en-GB
Context: A hopper wagon is a type of freight railway vehicle for transporting bulk commodities. The hopper wagon comprises a hopper wagon body with a hopper chamber for storing bulk commodities. The hopper wagon body is supported by an underframe. Bogies may be coupled to the underside of the underframe to allow the hopper wagon to move along the railway track. The bulk commodities are loaded into the chamber through an inlet aperture and discharged through at least one outlet aperture.
Source: GB2511298

Italian

Term **carro tramoggia**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Al suddetto carro vagliatore sono collegati ulteriori carri, definiti in gergo tecnico carri tramoggia, nei quali il pietrisco scartato dal carro vagliatore viene raccolto, per poi essere trasportato e scaricato in opportune zone appositamente previste. L'unione del carro vagliatore e dei carri tramoggia di trasporto del pietrisco costituisce un vero e proprio convoglio operatore che si muove lungo i binari oggetto di manutenzione.
Source: IT201600084010A1

Russian

Term **вагон-хоппер**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Наибольшее распространение получил вагон-хоппер, который содержит ходовую часть, состоящую из двух двухосных тележек, кузов, расположенный на указанных тележках и включающий раму с разгрузочными бункерами и разгрузочными механизмами, боковые и торцевые стенки, крышу с загрузочными люками и механизмом блокировки указанных люков. Такую конструкцию имеет, например, вагон-хоппер, раскрытый в описании к патенту РФ на полезную модель RU 93761 (дата подачи заявки 09.12.2009, классы МПК B61D 7/00, B61D 17/00, B61F 1/00). Однако указанный вагон-хоппер обладает высоким коэффициентом тары и кроме того имеет низкую погонную нагрузку.
Source: RU0000149541

Entry number **20**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Railway tracks**
Original Entry Language: **EN**

English

Term **joint bar**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The rails 12 may be continuous welded rails that are welded together as a single piece over long distances, such as one or more miles or several kilometers. Alternatively, the rails 12 may be jointed track rails connected with joint bars, or other types of rails apparent to those skilled in the art. Under high temperature conditions, internal stress may develop in the rails 12 and the rails 12 may attempt to expand to relieve the stress.
Source: US20210078622
Term Note: Term also used in Canada.

Term **fishplate**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: geographical variant
Variant Code: en-GB
Context: A large proportion of railway track in the United Kingdom is of the jointed type in which adjacent lengths of rail are joined by means of connecting means known as "fishplates" (shown in Figure 1 of the accompanying drawings) which are fastened across the join on either side of the rail. These fishplates are bolted to each other through holes (normally four in number) in the web of the rail. When the bolts are tightened, through the application of a torque of at least 475Nm, the fishplates are forced to hold the two rails together in alignment.
Source: GB2433538
Term Note: Term also used in Australia, and also spelled "fish plate".

Term **splice bar**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: More recently, splice bars have been developed to join abutting track segments without the need for welding. Thus, U.S. 4,733,771 (Grundken et al.), U.S. 4,646,905 (Grundken et al.), U.S. 4,420,075 (Skolik et al.), and U.S. 4,157,751 (Grundke et al.) disclose special dogbone-shaped splice bars which are used to join 15 abutting track segments in conveyor systems designed for use in mines. However, since these splice bars are designed to permit a certain amount of angular mobility, they are not suitable in many applications. Furthermore, the odd shape of these splice bars increases their manufacturing expense, and requires special tooling 20 on the track segments.
Source: CA2163140

Italian

Term **ganascia**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Il giunto meccanico isolato a differenza del giunto meccanico tradizionale, comprende degli elementi di fissaggio (ganasce e bulloni o chiavarde) con superfici in materiale elettricamente isolante e comprende altresì una sagoma o spessore elettricamente isolante interposto nello spazio interstiziale tra le testate degli spezzoni di rotaia.
Source: IT201900018578

Russian

Term **стыковая накладка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Крепление композитных изолирующих накладок любых типов к концам рельсов в зоне изолирующих стыков производится при помощи болтовых соединений. Для фиксации болтов от проворачивания при затяжке и распределения нагрузки на композитный материал используются стопорные планки из металла. Данные соединения содержат стыковые накладки с двумя стопорными планками, на одной стороне, расположенные по обе стороны стыкуемых рельсов и выполненные в виде элементов удлиненной формы с поперечными сквозными отверстиями для размещения в них крепежных элементов, обеспечивающих стяжку между собой стыковых накладок с двумя стопорными пластинами через шейку соответствующего рельса.
Source: RU0000220326

Entry number **21**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **jumper cable**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: It is common practice to use a plurality of locomotives coupled together in a consist, with each locomotive assisting in pulling a train. The respective 15 locomotives may be interconnected electrically to provide power there between and to enable a single crew in one locomotive simultaneously actuate the controls of all locomotives in the consist. The electrical connections are conventionally provided by use of jumper cables which extend between and are releasably connected to permanently installed live receptacles on adjacent ends of the coupled locomotives to thereby provide power and/or control circuits between locomotives in the consist.
Source: CA1161102

Italian

Term **cavo di accoppiamento**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: The term is generic and might refer to other types of couplings. No eligible context was found, but there are occurrences in an official RFI (Rete Ferroviaria Italiana) document: "Per l'accoppiamento delle automotrici diesel e dei relativi rimorchi, viene usato un cavo BT con due teste di accoppiamento, che quando è inutilizzato si trova riposto nel vano di servizio delle automotrici. L'agente di condotta deve consegnare il cavo di accoppiamento al manovratore, che esegue l'accoppiamento BT. Il manovratore deve trasportare il cavo di accoppiamento dalla testata alla porta del veicolo indicata dall'agente di condotta o viceversa, mentre compete a quest'ultimo la sistemazione del cavo a bordo." (source: 'Istruzione per il servizio dei manovratori in uso sull'Infrastruttura Ferroviaria Nazionale.' available at: https://epodweb.rfi.it/Modules/Documenti/WFInfoScheda.aspx?q=TmYx%2FHSR%2BxzlR1uwbDQLyA%3D%3D)

Russian

Term **междувагонное соединение электрической магистрали**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Схемы электроснабжения грузовых вагонов (фиг. 1 и фиг. 2) включают электровоз 1, грузовые вагоны 2, контактную сеть 3, токоприемник 4, предназначенный для приема тока из контактной сети 3, инфракрасные излучатели 5, электрическую магистраль поезда 6, междувагонные соединения электрической магистрали 7, разрядник для защиты электрических цепей электровоза от повышенного напряжения контактной сети 8, автоматический выключатель 9, моторвентилятор электровоза 10, генератор электровоза 11, электрические цепи вспомогательного оборудования, управления, освещения и сигнализации электровоза 12, систему управления мощностью теплового потока 13, переключатель для подачи напряжения 50 В 14, инвентор-преобразователь напряжения 50-220 В 15, розетки электрической магистрали 16, главный трансформатор электровоза 17, обмотку собственных нужд главного трансформатора электровоза 18.
Source: RU0002728021

Entry number **22**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **reverser**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: A reverser refers to a double pole, double throw electro-mechanical commutator operating only at no load current and commonly used with two crossing contacts to reverse the current direction in a part of a circuit.
Source: WO/2008/144901

Term **reverser handle**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: The reverser handle controls the forward and reverse rotation of the electric motors to selectively drive the train forward or rearward, and includes a neutral position.
Source: US5542891

Italian

Term **invertitore del senso di marcia**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: L'invertitore del senso di marcia, a seconda del tipo di rotabile sul quale è installato, può fare corpo unico con il cambio di velocità, ed in questo caso è collocato in uscita del cambio stesso, oppure può trovarsi all'interno del ponte di trasmissione, ed in questo caso viene posto all'ingresso dello stesso ponte che prende così il nome di ponte invertitore.
Source: Carpignano, Augusto, Meccanica dei trasporti ferroviari e delle locomotive, Torino, Levrotto & Bella, (2003): 634.

Term **invertitore**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: synonym
Context: Quando l'invertitore fa parte del cambio di velocità, oppure del ponte (fig. 352), esso è generalmente realizzato con tre ruote coniche sempre in presa tra loro.
Source: Carpignano, Augusto, Meccanica dei trasporti ferroviari e delle locomotive, Torino, Levrotto & Bella, (2003): 634.

Russian

Term **реверсивная рукоятка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Наиболее близким источником является патент РФ №118116 от 10.07.2012, в котором раскрыт блок задатчика позиций бесконтактного контроллера машиниста, состоящий из корпуса с размещенными в нем механизмом фиксации позиций главной рукоятки с упругим фиксирующим и опорным элементами, механизмом фиксации позиций реверсивной рукоятки, датчиками позиций выступающих из кожуха главной и реверсивной рукояток, связанных между собой механизмом взаимной блокировки рукояток, отличающийся тем, что механизм фиксации позиций главной рукоятки содержит, по меньшей мере, один дополнительный упругий фиксирующий элемент, опорный элемент выполнен с дополнительными углублениями, а общее количество и расположение углублений соответствует количеству и расположению позиций главной рукоятки.
Source: RU0002720597

Entry number **23**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **switcher**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: A switching service locomotive or switcher is a railroad locomotive intended for moving cars and assembling trains of railroad cars to be ready for a road locomotive to take over and haul the train of cars for long distances at high speeds. Switchers and road switchers are the railroad rail analogs to tugboats. They can be used for disassembling a train that has been brought in, and generally moving railroad cars and other locomotives around a yard. Switchers may also make short transfer runs and may be the only motive power permitted on certain branch lines and at various customer facilities located along the line of road.
Source: CA3075075

Term **switcher locomotive**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: full form
Context: The tasks of marshaling of railcars in a rail yard or spotting railcars in an industrial facility are usually done by switcher locomotives, industrial locomotives or railcar movers.
Source: CA2729512

Italian

Term **locomotiva di manovra**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Alcune delle attività, rappresentate dai nodi, richiedono l'allocazione di una risorsa, sia essa una locomotiva, un agente o un binario. In questo caso, l'algoritmo sceglie la risorsa specifica da assegnare, nel caso siano disponibili diverse alternative. Inoltre, alcune attività richiedono l'esecuzione di un movimento, sia essa di una locomotiva di manovra, di un carro o di un treno.
Source: Integrazione di impianti merci, rete e modelli di ottimizzazione per l'esercizio in tempo reale degli impianti, Licciardello, Riccardo et al., Ingegneria Ferroviaria, 75(6), (2020): 417-440.

Russian

Term **маневровый локомотив**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Прибытие на пункт расформирования группы рельсовых транспортных средств с использованием линейной или магистральной тяговой единицы (магистрального локомотива). Впоследствии линейная или магистральная тяговая единица (магистральный локомотив) от группы рельсовых транспортных средств отцепляется. Группы рельсовых транспортных средств ожидает подготовку плана технологических операций по расформированию и подход тяговой единицы для выполнения технологических операций по расформированию (маневровый локомотив), так как требуется время на подготовку плана. При этом занимается приемо-отправочный путь.
Source: RU0002491196

Entry number **24**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **slack adjuster**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: A slack adjuster is also provided in the system to prevent over-extension of the piston from the brake cylinder as the brake shoes wear during use. The slack adjuster, when disposed on the same brake beam as the brake cylinder, causes a weight imbalance between the brake beams. The uneven weight distribution between the brake beams can lead to uneven wear of the brake shoes.
Source: WO/2017/019926

Italian

Term **regolatore automatico**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Costituisce uno dei tiranti principali della timoneria e permette la regolazione automatica della corsa dello stantuffo del cilindro a freno entro i limiti stabiliti dalle norme in vigore compensando il normale consumo dei ceppi che si verifica ad ogni frenatura (6). L'uso del regolatore automatico comporta i seguenti vantaggi: - realizza l'equilibrio della timoneria in entrambi i carrelli; - garanzia di una regolazione automatica del gioco tra ceppi e cerchione; - mantenere al massimo l'efficacia del freno; - aumento del peso frenato; - economia di energia per il diminuito consuma di aria; - possibilità di realizzare cilindri a freno più corti; - diminuita sorveglianza sulla regolazione del freno.
Source: Il veicolo ferroviario: carri, Principe, Evaristo, Roma, CIFI, (2010): 139-140.

Russian

Term **автоматический регулятор**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Автоматический регулятор работает следующим образом. При загрузке вагона кронштейн 14 опустится вниз на некоторую величину относительно рычага 17, при этом корпус 1 авторегулятора займет горизонтальное положение. Поскольку стержень 7 зажат фрикционными клиньями втулки 6, то винт 11 будет перемещаться относительно стопорного механизма 3, при этом гайка 10, перемещаясь с винтом 11, отойдет от конуса 9, пройдет зазор а холостого хода авторегулятора, упрется во внутреннюю обойму подшипника 12 и начнет скручиваться. В результате этого расстояние между кронштейном 14 и вертикальным рычагом 17 увеличится, произойдет регулировка рычажной передачи тормоза, т. е. компенсация износа тормозных колодок и изменения углов наклона рычагов.
Source: SU01310271

Term **авторегулятор**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: synonym
Context: Наиболее близкой к предложенной является тормозная рычажная передача (ТРП) железнодорожного транспортного средства по авт. св. СССР N 355061, кл. В 61 Н 13/20, 1972 г, содержащая двуплечие рычаги, шарнирно соединенные между собой одной распорной тягой (затяжкой), снабженной упорами, взаимодействующими с кронштейном, закрепленным на раме вагона. Одни концы вышеупомянутых двуплечих рычагов шарнирно соединены с штоками ТЦ, закрепленных на раме вагона или транспортного средства, а другие через авторегулятор (АРП) ТРП с тормозными тягами, к которым подключены типовые ТРП двухосных тележек.
Source: RU02086446

Entry number **25**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Rolling stock**
Original Entry Language: **EN**

English

Term **span bolster**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The span bolster supports the load of the railcar using camber to efficiently distribute the load from the railcar among the truck assemblies and axles. The manufacturing method discloses the fabrication and layout of a span bolster where non-stressed camber is incorporated into the structural elements of the span bolster. The camber is produced geometrically by parallelogram shaped plates supporting the weight of the railcar. The amount of camber may be modified for different load ratings. The railcar and span bolster are constructed of alloy steel to minimize railcar tare weight and maximize load capacity.
Source: US20220024499

Italian

Term **traversa**
Term Status: *candidate*
Usage Label: *proposed term*
Term Type: head term
Source: WIPO in collaboration with DIT, Università di Bologna
Term Note: Span bolsters are not employed in Italian railway vehicle construction; however, all types of bolsters, when components of a truck assembly, can be referred to as simply 'traverse' or 'travi.

Russian

Term **соединительная балка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Недостатком данного вагона является наличие в качестве соединения секций между собой соединительной балки, опирающейся на две тележки. Соединительная балка является сложной по конструкции, трудоемкой в изготовлении и металлоемкой. Кроме того, восприятие ударных нагрузок пятниковыми узлами в соединении тележки с балкой и балки с рамой котла без амортизирующих приборов снижает долговечность вагона.
Source: RU0000190013

Entry number **26**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Railway tracks**
Original Entry Language: **EN**

English

Term **tie plate**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Generally, a railroad includes at least one pair of elongated, substantially parallel rails coupled to a plurality of laterally extending ties, which are disposed on a ballast bed. The rails may be constructed from a plurality of rail pieces joined by joint bars to form the rails in the track direction. The rails are coupled to the ties by tie plates and spikes and/or spring clip fasteners, which is an example of a class of fasteners that may be referred to as elastic fasteners.
Source: US20160047091

Term **base plate**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Context: A long point rail 26 is mounted on base plate 20 at the heel end of frog 10 and has a rail end 28 which is connected to turn out line rail 12 to provide a connection for that rail to frog 10. A short point rail 30 is mounted on base plate 20 and has a rail end 32 which is connected to main line rail 16 to connect that rail to frog 10. Long point rail 26 and short point rail 28 are mounted on base plate 20 at an angle which is known as the angle of frog. These rails 26, 30 are rigidly bolted to a heel block 34 which is inserted between them and mounted on base plate 20 near the apex of the rails 26, 30.
Source: US4624428

Italian

Term **piastra**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Nell'esempio di figura 1, la piastra 63A è inserita attraverso uno spazio esistente fra la rotaia R2 ed il terreno o la massicciata per agganciarsi alla parte del piede della rotaia R2 che è situata dal lato opposto della rotaia R2 rispetto al braccio di supporto 45. Per fissare stabilmente l'apparato di controllo 5 al binario T_R, la rotaia R2 è serrata fra la piastra 63A e la contro piastra 63B, preferibilmente tramite una coppia di bulloni di morsetto 64 (uno solo dei quali è rappresentato in figura 4).
Source: ITRM20120109

Russian

Term **подрельсовая подкладка**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Брус железобетонный (поз. 1) выполнен с трапециевидными выемками (поз. 2) для установки углонаправляющих плит (поз. 3), между которыми на подрельсовые подкладки (поз. 4) установлен рельс (поз. 5), причем рельс крепится к брусу железобетонному при помощи шурупа-дюбеля (поз.6), установленного в отверстие (поз. 7) и упругих клемм (поз. 8).
Source: RU0000216547

Entry number **27**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Railway tracks**
Original Entry Language: **EN**

English

Term **track gauge**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Track Gauging [:] The track gauge has a direct bearing on the safe operation of the vehicle. If the gauge is too wide or too narrow relative to the gauge settings on the vehicle, then there is an increased risk of derailment. This is more so in track curves. By measuring directly or indirectly the track gauge, to a suitable accuracy, or measuring the combined or singular vertical acceleration of a wheel or wheel sets, track gauge conditions that are approaching the safety limits of the vehicle in motion can be detected. The driver can be warned and alarms given to alter the vehicle's travelling speed or alternatively to stop the vehicle.
Source: WO/2006/125256

Term **track gage**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: synonym
Term Description: spelling variant
Context: The track gage in North America is 56.5 inches (4 feet 8.5 inches). In one embodiment of the invention the length of the side walls of a pentagonal pan is 24.5 inches and the spout formed by the two front walls of the pan is another 3 inches. This gives a total longitudinal dimension of 27.5 inches and a ratio of pan length to track gage of about 0.5:1.
Source: US5224622
Term Note: Spelling variant commonly used in the United States and in Canada.

Italian

Term **scartamento**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Si definisce scartamento la misura della distanza che intercorre tra i bordi interni dei funghi delle due rotaie del binario.
Source: Lineamenti di infrastrutture ferroviarie, Policicchio, Franco, Firenze, Firenze University Press, (2007): 41.

Russian

Term **ширина колеи**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Ширина колеи позволяет без смены локомотива и колесных тележек вагонов продолжить движение, однако отсутствие на борту локомотива оборудования для работы обеих систем интервального регулирования вынуждает эксплуатационную организацию производить смену локомотива в зависимости от действующей системы интервального регулирования по впереди лежащего маршрута следования.
Source: RU0002768688

Entry number **28**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Signaling & points**
Original Entry Language: **EN**

English

Term **train detection system**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: A train detection system 16 detects at least one train characteristic (e.g. presence, position, speed) relating to the train 10 approaching the railroad crossing 6 along the railroad 8.
Source: WO/2011/106834

Italian

Term **sistema di rilevamento dei treni**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Tali controindicazioni riguardano fondamentalmente: 1) l'usura della ruota e l'usura della rotaia in condizioni di aderenza normale (rotaia asciutta); la presenza di sabbia sulla rotaia aumenta l'usura della ruota e della rotaia; 2) la sabbia può creare uno strato isolante aumentando la resistenza del contatto elettrico ruota-rotaia con il rischio di compromettere il funzionamento dei sistemi gestione del traffico ferroviario, come il sistema di rilevamento dei treni (sistemi conta-assi); Per queste ragioni, l'utilizzo delle sabbiere a bordo dei veicoli ferroviari è regolamentata da normative specifiche dell'operatore oppure da normative nazionali oppure da standard europei di riferimento.
Source: IT201800003434A1

Russian

Term **система обнаружения поездов**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Уровень ETCS определяет оснащенный путь и способ передачи информации между путем и транспортным средством: - Уровень 1: информация передается через Eurobalise, которые являются транспондерами, установленными напутях и подключенными к сигнальному оборудованию. Необходима система обнаружения поездов.
Source: Цифровая железная дорога Европы - от ERTMS до искусственного интеллекта, Покусаев, О.Н. и др., International Journal of Open Information Technologies, 7(7), (2019): 90-119.

Entry number **29**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Signaling & points**
Original Entry Language: **EN**

English

Term **treadle**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: The train sensor may be any sensor that can sense that a train has passed through the signal. Such suitable sensors include, but should not be limited to, treadles and camera sensors. Where the sensor is a camera sensor, the sensor may include a speed sensor for sensing the speed of the train. Preferably, the sensor is a treadle. A treadle gives accurate information about the position of a train on the track. Suitably, the treadle is positioned down track from the signal in order to sense the train after it has passed through the signal.
Source: GB2468597

Italian

Term **pedale**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: L'accertamento del passaggio di un treno in un determinato punto di una linea è un accertamento che ha in genere lo scopo di determinare la liberazione della tratta a monte e viene quindi effettuato con apparecchiature con azione positiva che sono generalmente dei pedali.
Source: Impianti ferroviari. Tecnica ed esercizio, Mayer, Lucio, Roma, CIFI, (1986): 551.

Russian

Term **рельсовая педаль**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Рельсовые педали представляют собой контакты, приводимые в действие проходящим поездом. Они устанавливаются под рельсами или сбоку их и служат для замыкания электрических цепей при проследовании поездом определенных точек пути.
Source: Автоматика, телемеханика, связь и вычислительная техника на железных дорогах России, Сороко, В.И. и др., Москва, НПФ "ПЛАНЕТА", (2006): 127.

Entry number **30**
Entry class: **Semi-validated**
Originator: **WIPO-PCT with the University of Bologna at Forli, IT**
Subject Field: **RAIL (Railway Engineering)**
Subfield: **Auxiliary equipment**
Original Entry Language: **EN**

English

Term **turntable**
Term Status: *validated*
Term Reliability: *3*
Usage Label: *allowed*
Term Type: head term
Context: Turntables for transporting a vehicle between two sets of tracks are known. When it is desired to transfer a vehicle between two sets of tracks, and the included angle between the tracks is other than 90 degrees, turntables become impractical. Also, if it is desired to transfer a vehicle from one set of tracks to two or more sets of intersecting tracks, or vice versa, a turntable is required at each of the intersections to change the direction of the vehicle.
Source: CA1064325

Italian

Term **piattaforma girevole**
Term Status: *candidate*
Usage Label: *allowed*
Term Type: head term
Context: Tale disposizione, con l'inserimento di una piattaforma girevole, consentiva di girare le locomotive a vapore (che sono unidirezionali). La moderna disposizione (non essendo più necessaria la piattaforma girevole) prevede, invece, una rimessa a pianta rettangolare.
Source: Lineamenti di infrastrutture ferroviarie, Policicchio, Franco, Firenze, Firenze University Press, (2007): 137.

Russian

Term **поворотный круг**
Term Status: validated
Term Reliability: 3
Usage Label: allowed
Term Type: head term
Context: Известны железнодорожные поворотные круги для перевода подвижных единиц (авт. свид. N 1551574, кл. B 61 J 1/04). Поворотный круг содержит платформу, имеющую опорные колеса и расположенные под углом друг к другу рельсовые пути.
Source: RU02092350