



A Study on Part-of-Speech Conversion in English-Chinese Translation of Petroleum Scientific and Technical Texts

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How to cite this paper: Sun, Y.L. (2026) A Study on Part-of-Speech Conversion in English-Chinese Translation of Petroleum Scientific and Technical Texts. *Open Access Library Journal*, 13: e15610. <https://doi.org/10.4236/oalib.1115610>

Received: June 11, 2026

Accepted: July 11, 2026

Published: July 14, 2026

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Abstract

Part-of-speech conversion is one of the core techniques in the translation of petroleum scientific and technical English. In the context of petroleum technical texts, English and Chinese differ remarkably in lexical structures, making literal word-for-word translation hardly feasible. Combining practical translation cases in the petroleum technical corpora (covering drilling, reservoir engineering, oil production, industry standards and field operation manuals), this paper systematically analyzes the conversion rules of nouns, adjectives, prepositions, verbs and other parts of speech in English-Chinese translation. It proposes a three-tier progressive processing strategy consisting of literal retention, part-of-speech conversion and sentence restructuring, and summarizes the systematic application of part-of-speech conversion methods in petroleum scientific and technical translation.

Subject Areas

Linguistics

Keywords

Petroleum Scientific and Technical English, Part-of-Speech Conversion, English-Chinese Translation

1. Introduction

English and Chinese differ fundamentally in syntactic structures, expressive conventions and thinking modes. Scientific and technical English texts feature a static style, and frequently adopt abstract nouns, prepositional phrases and nominalized structures to achieve compact sentence patterns and objective expression. By con-

trast, scientific and technical Chinese writings are generally dynamic in nature, with verbs as the core element. They tend to use short sentences and active voice, and avoid excessive stacking of redundant abstract nouns. As a highly specialized practical writing genre, petroleum scientific and technical English is characterized by dense terminology, prominent nominalization, frequent use of passive voice and complex sentence structures. Such linguistic traits are far more prominent in drilling, reservoir stimulation and production logging documents than in general scientific texts, for petroleum engineering requires condensing multi-step construction workflows into concise nominal phrases for technical record-keeping [1]. A rigid word-for-word translation that mechanically retains the original parts of speech will easily lead to semantic distortion and logical confusion in the target text, and may even result in misunderstanding of technical content and potential risks to field operations.

Part-of-speech conversion serves as a core technique to bridge lexical discrepancies and realize semantic equivalence in scientific and technical English translation. Its application shall abide by the principles of semantic fidelity, standardized terminology, contextual adaptation and idiomatic expression, with flexible conversion adopted in light of industry scenarios. At present, extensive studies have been conducted on part-of-speech conversion for general scientific and technical English, while targeted corpus analysis focusing on segmented fields such as petroleum engineering, drilling and production, as well as oil and gas storage and transportation, remains insufficient [2]. Given this, this paper takes authentic petroleum scientific and technical corpora as its core, which includes: 1) peer-reviewed journal articles and conference papers on drilling; 2) operational procedures and daily reports from oilfields; 3) international and Chinese industry standards; and 4) equipment manuals. Examples were selected by first identifying frequent part-of-speech conversion patterns in pilot readings and then choosing representative sentences that illustrate common syntactic structures and typical operations. It systematically explores the conversion and application rules of major parts of speech, including nouns, prepositions, adjectives and verbs in English-Chinese translation. Through analysis of typical examples, this paper tries to summarize practical translation strategies, thus providing references for the practice of petroleum scientific and technical translation.

2. Linguistic Rationale for Part-of-Speech Conversion

Lexical discrepancies between petroleum scientific and technical English and Chinese stem from their systematic divergences in typology, cognitive encoding and textual organization that lay a solid foundation for illustrating the necessity of part-of-speech conversion.

In respect of linguistic typology, English has a sophisticated nominalization system, which enables the conversion of dynamic meanings into static nominal expressions and forms a syntax centered on nouns and prepositions [3]. This tendency is more prominent in petroleum technical texts: numerous technological

processes are condensed into nominal phrases, while verbs often work as copulas or function words. As an isolating language, Chinese takes verbs as its syntactic core and lacks systematic nominalization, featuring a verb-dominated structure. Accordingly, such nominal constructions must be converted into verbal expressions in Chinese petroleum technical writing. Otherwise, the expressions will depart from Chinese syntactic conventions and result in ambiguous information.

In respect of cognitive linguistics, English tends to objectify technical processes by categorizing dynamic procedures into static entities to facilitate logical deduction and cross-sentential reference. By means of this mechanism, petroleum scientific and technical English converts sequential operations, including drilling, fracturing and water injection, into conceptual modules for classification and reasoning. By contrast, Chinese favors a temporal construal mode, presenting events in chronological order and causal chains, and using verb sequences to describe operational procedures. Petroleum engineering activities are highly time-sequenced, represented by the workflow of drilling, casing running, cementing and well completion, which can be naturally reproduced by Chinese verb chains. Failure to convert specific static words in English into verb sequences in Chinese will disconnect the translated text from engineering practice at the cognitive level.

In respect of textual structure, English technical discourse tends to pursue syntactic compactness by implying multi-layered logic within phrases. Petroleum technical English frequently uses declarative sentences with abstract nouns as subjects and adjectives as predicates, as well as complex sentences piled with lengthy prepositional phrases. Chinese technical texts prefer dynamic narration in the form of running sentences, unfolding events through a series of short clauses with logical relations implied by word order [4]. Essentially, part-of-speech conversion transforms the static logical framework of petroleum English into the dynamic narrative framework of Chinese.

To conclude, part-of-speech conversion works as an essential link connecting the source language of petroleum scientific and technical English and its target Chinese revision. Its necessity is rooted in typological differences between English and Chinese, textual characteristics of petroleum documents and practical demands of engineering work. It is an indispensable strategy to achieve dual goals of preserving technical information and conforming to Chinese idiomatic usage, and also provides a theoretical basis for the subsequent discussion on principles, classification and operational framework in this paper. Therefore, part-of-speech conversion is not merely a rhetorical technique, but a linguistic prerequisite for accurate semantic transmission and natural textual expression in the English-Chinese translation of petroleum scientific and technical texts [5].

3. Principles for Part-of-Speech Conversion in Petroleum Scientific and Technical English

In the English-Chinese translation of petroleum scientific and technical texts, standardized application of part-of-speech conversion shall abide by the following

four core principles to guarantee accurate transmission of professional information and improve overall text quality [6].

1) Principle of Priority to Professional Meaning

Petroleum scientific and technical texts feature rigorous terminology and high context dependency. The primary prerequisite for part-of-speech conversion is to fully retain the accuracy of professional concepts. Under no circumstances shall the technical connotation be distorted or obscured due to changes in word classes. Regardless of the grammatical functions of original words, their established petroleum-specific definitions in given contexts such as drilling, oil production and geological interpretation must remain intact.

2) Principle of Contextual Adaptation

Petroleum scientific and technical documents cover a variety of styles with distinct requirements for formality and rhythm of expression. Strategies for part-of-speech conversion shall be adjusted flexibly according to text functions and application scenarios. For action-oriented documents, including operating procedures and field logs, conversions such as nominal-to-verbal and prepositional-to-verbal shifts are preferable to enhance the dynamism and operability of instructions. For formal written texts that stress rigorous logic and objective statements, including academic papers, industrial standards and geological reports, priority shall be given to conversions from verbs to nouns and adverbs to adjectives, so as to maintain the solemn syntactic style and information density. This principle requires conversion methods to adapt to specific contexts and prohibits rigid application.

3) Principle of Conciseness and Fluency

Translations of petroleum technical texts feature compact wording, precise expression and coherent logic. As a means to optimize and restructure sentence pattern, part-of-speech conversion aims to eliminate Europeanized sentence patterns in original text and reduce semantic redundancy caused by multi-layered modifiers. In view of prevalent nominalized structures, lengthy post-modifiers and complicated prepositional phrases in English, appropriate part-of-speech conversion rules can transform them into verb-object phrases and subject-predicate structures conforming to Chinese expressive habits. This principle helps to avoid cumbersome sentences and redundant information resulting from word-for-word translation, and improves the readability and communication efficiency of target texts.

4) Principle of Logical Coherence

Professional concepts in petroleum science and technology texts are linked by rigorous logical relations such as cause and effect, condition, and coordination. Part-of-speech conversion should ensure that the logic of the original text is clearly reproduced in the target language and prevent grammatical shifts from breaking semantic chains or creating logical discontinuities. Through reasonable part-of-speech conversion and restructuring of sentence patterns, the translation can achieve smooth logical cohesion while maintaining the integrity of technical information and preserving the rigor of technical reasoning and the traceability of information.

4. Major Types and Application Strategies of Part-of-Speech Conversion

Based on the linguistic rationale and the above-mentioned translation principles of part-of-speech conversion in petroleum scientific and technical English, this part will further explore the specific application methods of part-of-speech conversion in practical translation scenarios. Combined with the dominant static stylistic tendency of petroleum English and the verb-favored dynamic expression conventions of Chinese technical discourse, this section tries to categorize and summarize the most frequently adopted part-of-speech conversion types in petroleum engineering, drilling, and oil and gas development texts. With typical authentic petroleum technical sentences as research cases, it elaborates on the applicable scenarios, operational logic and practical translation strategies of each conversion type, so as to form targeted and operable translation norms for English-Chinese translation of petroleum scientific and technical texts [7].

1) Conversion of Nouns into Verbs

Derivative nouns, action nouns and nominalized constructions are widely adopted in petroleum scientific and technical English to summarize technological processes, technical phenomena and working principles, which renders the text objective, concise and formal. English and Chinese differ greatly in technical expression: technical English tends to use static nouns to convey dynamic actions, while Chinese relies greatly on verbs to describe technical operations and operational processes. Accordingly, proper conversion of nouns into verbs serves as a key method to streamline expressions, deliver professional meanings accurately, and improve the readability and professionalism of translated texts.

Example 1.

ST: Water injection can effectively supplement formation pressure in low-permeability reservoirs.

TT: 向地层注水, 可有效补充低渗透油藏地层压力。

Analysis: The core of this translation lies in converting the noun phrase “Water injection” in the original text into a verbal structure in Chinese, which represents a typical part-of-speech conversion between English and Chinese. English prefers abstract nouns, such as injection to express actions, whereas Chinese favors concrete verbs. Instead of literally translating it into the static nominal form “水的注入”, the version adopts the dynamic verb phrase “注水” and adds the directional adverbial “向地层” to complete the meaning and achieve natural expression. Additionally, the implicit agent in the original sentence is omitted by using a subjectless sentence, conforming to the concise style of Chinese technical writing.

When converting nouns into verbs, translators first need to identify derivative nouns, action nouns and nominalized structures that denote actions, processes or states, with focus on those derived from verbs and corresponding to technical operations and procedures. Taking such nouns as the conversion starting point, translators may render them back into Chinese verbs and restructure predicates

and verb-object phrases, shifting the syntactic focus from static nouns in English to dynamic predicates in Chinese. Meanwhile, in line with the expressive habits of Chinese technical language, implicit subjects and logical elements can be supplemented, and the order of modifiers adjusted to fully preserve professional meanings. Such systematic conversion adapts the text to the verb-centered dynamic expression mode of Chinese technical writing and ensures clear logic and accurate meaning delivery.

2) Conversion of Prepositions into Verbs

Prepositions are used far more frequently in petroleum scientific and technical English than in Chinese. Some prepositions carrying implications of actions and directions can not only establish logical connections, but also describe operational behaviors and technological processes. By contrast, Chinese mainly employs verbs to directly reflect actions and state changes, and rarely uses prepositions alone to link sentences. Therefore, converting certain English prepositions into Chinese verbs helps faithfully reproduce operational procedures, migration rules of media and state evolution, and guarantees complete meanings and rigorous expressions in translations.

Example 2.

ST: The pump delivers mud at high pressure to the bottom of the hole via the drill string.

TT: 泥浆泵借助钻柱, 将高压泥浆送至井底。

Analysis: Literal translation of the prepositional phrase “via the drill string” would result in stiff wording and unprofessional expressions. In this translation, the preposition “via” is converted into the notional verb “借助” to turn the prepositional element indicating means into a verbal component, which fits the dynamic feature of Chinese expressions. Following the principles of conciseness and professionalism for engineering text translation, the word order is rearranged, and “at high pressure” is transformed into the pre-modifier “高压泥浆”. Combined with the conversion of prepositions into verbs, the translation fully retains the core information, including the operating subject, pressure condition, transmission path and target position. It features coherent logic and complies with the writing norms of petroleum drilling documents.

In the conversion of prepositions into verbs, priority should be given to identifying prepositions that function as syntactic connectors and meanwhile imply dynamic meanings such as manners of action, access routes, tools and accompanying states. The implicit action meanings of such prepositions can be made explicit and translated into notional verbs in Chinese like “借助”, “利用” and “伴随”, turning original prepositional phrases into verb phrases or serial verb constructions. Furthermore, the newly converted verbs can be integrated into Chinese running sentences, and the order of adverbials adjusted according to petroleum professional contexts, so as to restore technical procedures and internal logic via coherent verb sequences. This conversion realizes a smooth transition from the static

linking mode of English prepositions to the dynamic narrative mode of Chinese verbs, and balances professionalism, logicity and readability of the translated text.

3) Conversion of Adjectives into Verbs

In petroleum scientific and technical English, adjectives are generally used as attributes or predicatives to describe material properties, states or degrees. Nevertheless, some adjectives imply actions or changing processes in specific technical contexts. Chinese tends to adopt verbs to directly present such state transitions rather than retaining adjectival forms. Literal translation often results in awkward expressions or incomplete information. Therefore, in English-Chinese translation, such adjectives should be converted into Chinese verbs according to contexts to clearly convey technical operations, property evolution or condition changes.

Example 3.

ST: High viscosity of the fracturing fluid is essential for effective proppant transport.

TT: 压裂液必须具有较高粘度, 才能有效输送支撑剂。

Analysis: The original sentence adopts a nominal phrase “High viscosity” as the subject and the adjective “essential” as the predicative, stating objective technical conditions via static adjectival structures. In translation, the static nominalized sentence pattern of English is restructured. The adjective essential is converted semantically into a verbal expression, replacing the wordy static statement “...是必不可少的” with the dynamic phrasing “必须具有”. This conversion transforms the static declarative sentence in English into a subject-predicate structure commonly used in Chinese. The implicit logical link “so as to” is supplemented to fully reflect the technical correlation between fracturing fluid viscosity and proppant transport. The translated text is fluent and compact with accurate professional meaning, complying with the concise and rigorous standards for the translation of oil and gas engineering documents.

In link-verb constructions and attributive-head structures of petroleum scientific and technical English, priority shall be given to identifying adjectives that imply action tendencies, restrictive requirements, potential states and state changes, especially evaluative adjectives describing technical conditions, performance indicators and variations of material properties. During translation, such adjectives can be rendered into modal verbs, directional verbs or notional verbs in Chinese, such as “必须, 能够, 呈现”, so as to break the constraints of original static declarative sentences. Meanwhile, the predicate structure of sentences is restructured. Nouns modified by adjectives are converted into subjects or objects of verb-object structures, and implicit logical relations, including conditions, purposes and causes, are supplemented in line with professional logic.

4) Conversion of Verbs into Nouns

Noun-to-verb conversion is the predominant approach in English-Chinese translation. However, to conform to professional writing styles and highlight tech-

nical attributes and objective facts in petroleum texts, verb-to-noun conversion is also frequently adopted. Especially when handling English passive sentences and objective descriptive statements, converting action verbs into Chinese nouns helps downplay the agent and focus on equipment performance, technological characteristics and physicochemical properties.

Example 4.

ST: The pipeline system resists corrosion under high-temperature and high-pressure environment.

TT: 高温高压环境下, 管道系统具备良好的耐腐蚀性。

Analysis: The predicate verb structure “resists corrosion” in the original text emphasizes the active anti-corrosion behavior of the pipeline system. In line with the linguistic habit of Chinese technical texts, which prefer static and objective expressions with nouns and nominal phrases, the dynamic meaning of the verb “resist” is converted into a nominal concept and integrated into the nominal phrase “耐腐蚀性”, realizing the conversion from verb to noun. In addition, the adverbial of environment “under high-temperature and high-pressure environment” placed at the end of the original sentence is moved to the front, conforming to the convention of placing adverbials upfront in Chinese. Abandoning the literal dynamic sentence pattern, the translation adopts static nominal expressions for restructuring. It faithfully delivers the original technical meaning while achieving conciseness and logical coherence, which fit the formal, rigorous and succinct stylistic features of engineering documents.

For verbs or verb phrases that mainly describe equipment performance, material properties and technological characteristics instead of operational actions, their dynamic meanings can be abstracted and refined into Chinese nouns or nominal phrases indicating properties or capabilities. In practice, the agent in the original text is usually weakened or omitted, and the action process is transformed into an objective inherent property. This realizes the shift from narration of dynamic behaviors to judgment of static properties, making the translation more consistent with the formal, objective and solemn style of Chinese scientific and technical texts.

5. Operational Framework of Part-of-Speech Conversion

Based on the above case analyses, part-of-speech conversion in the English-Chinese translation of petroleum scientific and technical texts can be divided into three operational levels with varying degrees of linguistic processing.

The first level is literal retention. Where the part of speech of English words has direct equivalents in Chinese and the expressions conform to Chinese linguistic conventions, the original word classes can be retained without further adjustment. This method relies on partial isomorphism of semantic categories between the two languages. Restricted by their typological discrepancies, it is only applicable to a limited range of cases. Literal retention features simple operation and high effi-

ciency, yet it cannot resolve translation difficulties arising from the unbalanced distribution of word classes between English and Chinese, thus serving merely as a basic translation method.

The second level refers to core conversion, namely part-of-speech transformation. It focuses on the expressive disparities between English and Chinese. It is known that English tends to convey meanings through static elements such as nouns, prepositions and adjectives, while Chinese would prefer to use verb-dominated dynamic narrative structures. Accordingly, systematic part-of-speech conversions are required in English-Chinese translation, mainly including conversions from nouns, prepositions and adjectives to verbs, as well as shifts from verbs to nouns. Because of these, this level is the principal component of operational framework. Its core guideline can be summarized as follows: English is predominantly static-oriented, while Chinese is dynamic-oriented. Translators shall replace the syntactic cores of nominal phrases with verbs to achieve natural semantic transfer and adapt the writing to Chinese linguistic intuition.

The third level is sentence restructuring. When semantic conversion cannot be fully accomplished at the lexical level through part-of-speech adjustment, overall revision of syntactic structures is adopted. Specific practices include decomposing English nominalized structures into serial verb phrases in Chinese, converting passive sentences into active ones with corresponding rearrangement of subjects and objects, and splitting lengthy complex sentences with multiple embedded layers into logically connected running sentences. As a supplement and in-depth extension of the former two levels, this approach is applicable to technical texts with complicated sentence patterns.

From a cognitive perspective, part-of-speech conversion essentially means re-categorizing the semantic structure of the source language in line with the categorical system of the target language. A qualified conversion is far from mechanical replacement of word classes. On the premise of ensuring semantic fidelity, it pursues natural and idiomatic expressions, and ultimately realizes the organic integration of source language information and cognitive conventions of the target language.

6. Conclusions

In the translation of petroleum scientific and technical English, the core of part-of-speech conversion stems from the systematic typological differences between English and Chinese. English takes nouns and prepositions as its syntactic focus and features static objectified description, whereas Chinese centers on verbs and features dynamic chronological narration. On this basis, this paper defines four fundamental principles: priority to professional meaning, contextual adaptation, conciseness fluency and logical coherence. It systematically introduces four major conversion types: nouns to verbs, prepositions to verbs, adjectives to verbs, and verbs to nouns, and talks about their applicable contexts and operational methods through analyzing typical translation examples. Besides, this paper establishes a

three-tier operational framework consisting of literal retention, part-of-speech conversion and sentence restructuring. It holds that part-of-speech conversion is not a mere replacement of word classes, but a process of recategorizing English semantic structures in line with Chinese cognitive categories. Therefore, translators shall accurately identify nominalized structures, link-verb predicative sentences and prepositional cohesive patterns in the source text, and flexibly adopt the tiered conversion strategies. On the premise of guaranteeing accurate transmission of professional information, translators can restructure precise and idiomatic technical expressions in Chinese.

However, this research has several limitations and there is a room for improvement. The translation framework proposed in this paper is generalized based on selected petroleum technical corpus samples, so its applicability may not fully cover all types of petroleum texts and subfields. In addition, the paper relies on qualitative analysis of typical examples without quantitative statistical support from large-scale corpus data. Future research can expand the scope of corpus research, combine quantitative corpus statistics to verify the universality of conversion rules, and further enrich and optimize the translation rules summarized in this paper.

Conflicts of Interest

The author declares no conflicts of interest.

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