

Research on Chinese Translation of Mechanical Engineering English Lexis and Syntax in MTPE Mode—A Case Study of DeepSeek

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Abstract: As globalization accelerates, international exchanges and cooperation in mechanical engineering have grown increasingly frequent, driving a steady rise in demand for translation. As traditional human translation tends to be relatively inefficient, and pure machine translation struggles to meet industry quality standards, the MTPE (Machine Translation Post-Editing) model has come into being. This study uses DeepSeek as a case study to explore post-editing strategies for mechanical engineering English under this model. As a key branch of scientific and technological English, mechanical engineering English plays a vital role in disseminating mechanical engineering expertise and facilitating international exchanges and cooperation. Such texts are marked by distinct features, strong professionalism, and considerable difficulty. At the lexical level, they employ a wealth of technical terms, nominalized structures, and abbreviations. At the syntactic level, passive voice and long, complex sentences are frequently used. Under the MTPE framework, this paper first outlines the research background, then analyzes domestic and international research on post-editing strategies for mechanical engineering English, identifies existing gaps and shortcomings, and highlights the innovations of this study. Next, it examines the strengths and limitations of DeepSeek in translating mechanical engineering English. It then offers a detailed overview of this mode, covering its core concepts, functional scope, and the specific advantages it brings to mechanical engineering English translation. By analyzing the linguistic features of mechanical engineering English at both lexical and syntactic levels, this paper selects several translation samples to explore post-editing strategies for words and sentences in this domain, aiming to provide practical insights that can enhance the quality and efficiency of mechanical engineering English translation.

Keywords: Mechanical engineering English; Machine translation; Post-editing; English to Chinese translation

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1. Research Background

In the context of globalization, Zhang Yahui observes that it has accelerated the international integration of the mechanical engineering industry^[1]. Wen Hong has summarized that international exchanges in mechanical engineering, especially product trade and foreign trade restructuring, which have made English translation indispensable for global sector collaboration^[2].

While traditional human translation offers advantages in accuracy and expertise due to translators' specialized

knowledge, its high costs and inefficiency are becoming increasingly apparent. When handling urgent projects or large-scale translation tasks, relying solely on human translation often proves inadequate in meeting tight deadlines.

Dai Guangrong has claims that machine translation, particularly advanced systems like DeepSeek leveraging neural networks, delivers near-instant results through powerful algorithms and vast datasets^[3]. Yet for technical English, its output remains inconsistent. Recurring issues like term mistranslations, incoherent logic, and convoluted phrasing hinder international collaboration and may even trigger operational incidents or contractual disputes.

The MTPE(Machine Translation Post-Editing) model addresses these challenges by synergizing machine efficiency with human expertise, achieving both productivity and precision in mechanical engineering translation. This study investigates lexical and syntactic post-editing strategies to optimize translation quality.

2. Literature Review

In recent years, with the rapid development of globalization, the demand for translation has surged, posing significant challenges to the language services industry. To meet this demand, MTPE has been widely applied in various fields, including medicine, chemical, maritime and finance.

2.1. Domestic Research Status

Domestic research on post-editing emerged in the early 21st century. Initial studies focused predominantly on tool design and development^[4]. Since 2015, the investigations into conceptual frameworks, error typology, and skill development have increased significantly. However, the research content is relatively limited and lacks innovation.

2.2. Global Research Status

International research on post-editing dates back to the 1980s, spanning four decades of scholarly investigation into key areas, including theoretical frameworks, text translatability, machine translation error analysis, specialized tool development (such as memoQ, SDL Trados, PET, ACCEPT and CSMACAT), and professional training standards, demonstrating a comprehensive integration of technological innovation and pedagogical development within the field^[5].

International research into the MTPE model is both more thorough and comprehensive. To gain a deeper understanding of the intricate post-editing process, scholars have explored translators' behaviors, the challenges they encounter, and the specific strategies they employ in great detail. Such research offers valuable insights for optimizing post-editing practices, enhancing translation quality, and advancing machine translation systems.

3. The Application of DeepSeek in Mechanical Engineering English Translation

DeepSeek, an advanced AI conversational assistant developed by DeepSeek Company, leverages cutting-edge large language model technology, it accurately analyzes complex linguistic elements including semantics, emotional tone, and user intent while generating contextually relevant responses, positioning itself as a premier Chinese AI assistant that significantly enhances information processing efficiency.

3.1. Advantages

DeepSeek has some advantages in English translation of mechanical engineering.

3.1.1. Translate professional terms speedily

There are a large number of technical terms in mechanical engineering English^[6]. DeepSeek can infer their meanings based on context and word formation, providing relatively appropriate translations. For example, terms such as “thread cutting(

“螺纹切削”), “die(模具)”, “clearance fit(间隙配合)” are translated accurately, which demonstrates its effectiveness in handling such linguistic features.

3.1.2. Deal with abbreviations and nominalized structure quickly

Abbreviations and nominalized structures is commonly used in mechanical engineering English^[6]. DeepSeek can infer their meanings based on context and word formation, providing relatively appropriate translations. For example, terms such as “headstock(床头箱)”, “worktable(工作台)”, “NC (numerical control; 数控)” are translated accurately, which demonstrates its effectiveness in handling such linguistic features

3.1.3. Adapt to different contexts

Generally speaking, the sentence structure in mechanical engineering English is complex. When dealing with these long and difficult sentences, DeepSeek can split and reorganize them, thus generating relatively accurate translations.

3.1.4. Support multiple input ways

In addition to text input, DeepSeek also supports various input ways such as voice and photo taking, which greatly improves the convenience and flexibility of mechanical engineering English translation. For example, when users need to translate a mechanical engineering drawing, they can take a photo of the drawing and upload it to DeepSeek to obtain the relevant translation.

3.2. Limitations

Although DeepSeek has many advantages in translating mechanical engineering English, it also has some limitations.

3.2.1. Inaccurate translation of professional terms

In mechanical engineering English, accurate translation of technical terms is of great importance^[7]. However, DeepSeek cannot accurately translate all terms. For instance, “gasetron(泵 弧 整 流 器)” has a specific meaning in the field of mechanical engineering. But without context information, it may be transliterated. Similarly, translating a technical term like “boring(镗 : refers to the boring process in machining)” into its common meaning “not interesting or making you feel tired and impatient”(无聊的). These mistranslation issues are bound to cause misunderstandings for readers of the target text.

3.2.2. Inaccurate understanding of sentence structure

Texts in mechanical engineering English usually contain a large number of long and difficult sentences with complex structures^[8]. When processing such sentences, DeepSeek may misinterpret their structural logic, resulting in target texts that lose the original logical connections and coherence—ultimately leading readers to misapprehend the meaning.

3.2.3. Improper context handling

Some expressions in mechanical engineering English may be influenced by the context^[8]. Deepseek may mistranslate them due to a lack of understanding of the relevant context. For example, in the sentence “Any two such forces acting on a body constitute a couple^[9], here the word “couple” usually refers to “couple of forces” in the field of mechanical engineering. But DeepSeek may literally translate it as “pair”, and such a translation loses the accuracy and rigor of the source text.

3.2.4. Unable to recognize and process specific formats

When translating relevant corpora, translators often encounter some materials in special forms, such as drawings, tables, formulas, etc. In such scenarios, DeepSeek’s outputs often suffer from formatting inconsistencies or incomplete translations, which may hinder readers’ comprehension.

In conclusion, although DeepSeek has some advantages in the translation of mechanical engineering English, it still cannot completely replace professional translators. In some scenarios with high requirements for professionalism and accuracy, manual translation is still needed to ensure the quality of the translation.

4. “MTPE” Model

“MTPE” refers to the combination of Machine Translation (MT) and Post-Editing (PE). MT refers to translation performed entirely by computer software without human involvement. As deep learning technology continues to advance, the accuracy of machine translation has been steadily improving. Compared with traditional human translation, machine translation can handle large volumes of text at a lower cost and in a shorter time.

PE is typically conducted after machine translation, involves revising and refining the output generated by machine translation. It includes correcting issues such as grammatical errors, mistranslations, and omissions, thereby enhancing the accuracy and readability of the translation and ensuring the quality of the target text.

This model combines fast machine translation with human translation, which can significantly improve translation efficiency and accuracy^[10]. For example, mechanical engineering English contains a large number of technical terms. MT can preliminarily translate relevant terms, and then PE can make necessary corrections and adjustments. Therefore, this model can not only improve translation efficiency and ensure translation quality, but also reduce the cost of manual translation, meeting the growing demand for mechanical engineering English translation in the information age.

5. Linguistic Features of Mechanical Engineering English

As a type of English for science and technology, Mechanical Engineering English has distinct language features.

5.1. Lexical features

As a branch of scientific and technical English, mechanical engineering English boasts distinct vocabulary features, with translation approaches varying significantly depending on the type of vocabulary involved. Therefore, it is of profound significance for translators to familiarize themselves with and master the features and translation techniques of mechanical engineering English. The vocabulary traits of mechanical engineering English encompass the frequent application of terms, abbreviations, nominalized structures, etc.

5.1.1. Terms

Terms usually appear in specific pragmatic fields and professional textbooks, and they have univocality and precision^[11]. Mechanical engineering English contains a large number of terms. The meanings of terms are always clear with little ambiguity, but most of them are rarely involved in daily life, such as “main bearing(主轴承)”, “abundant lubrication(多油润滑)”, “adiabatic perturbation(绝热扰动)”, “allowedness(容许度)” and “anemoscope(风向仪)”.

5.1.2. Abbreviations

Abbreviations in English are characterized by their conciseness, clarity, convenience and efficiency. The use of abbreviations can reduce the burden of memory and improve the efficiency of communication^[12]. Therefore, there are a large number of abbreviations in mechanical engineering English. For example, DIN(Deutscher Industrie Normen: 德国工业标准, Simplified Chinese name: 德工标), OEE(Overall Equipment Effectiveness: 整体设备效率, Simplified Chinese name: 设备效率), FMEA(Failure Mode and Effects Analysis: 失败模式和效应分析, Simplified Chinese name: 失效分析) and CNC(Computer Numerical Control: 计算机数字控制, Simplified Chinese name: 数控).

5.1.3. Nominalization

Nominalization refers to the conversion of a verb or an adjective into a noun or a noun phrase, enabling it to acquire the meaning of the verb or adjective while possessing the grammatical functions of a noun^[13]. The use of nominalized structures can meet the requirements of conciseness, objectivity, and accuracy in Scientific and Technological English. As a type of it, so does Mechanical Engineering English. In translation practice, certain nominalized structures are typically rendered into verbs.

Example 1: The characteristics of a force are its magnitude, its direction, and its point of application.^[9]

5.2. Syntactic features

As part of scientific and technological English, English for mechanical engineering is clear, rigorous, compact in structure, prominent in key points, and objective and accurate in content expression. Undoubtedly, this puts forward higher requirements for translators' translation proficiency. Therefore, understanding and mastering the syntactic features and translation strategies of English for mechanical engineering can improve translators' translation efficiency and quality. The syntactic characteristics of English for petroleum geology are mainly reflected in the extensive use of the passive voice, attributive clauses, and long and difficult sentences.

5.2.1. Passive voice

Scientific and technical texts are characterized by clear organization, rigorous structure, and logical coherence. Therefore, compared to other styles, technical English frequently employs the passive voice, which helps minimize subjective assumptions caused by the use of first- and second- person pronouns. Mechanical engineering English is no exception. Due to the differences between English and Chinese, passive voice in English is often translated into active voice in Chinese.

Example 2: By the use of such special languages and systems, the control tapes can be prepared very quickly and economically, even for machining complex parts.^[14]

5.2.2. Long and difficult sentences

To avoid ambiguity, obscure and complex concepts in technical English often require long and difficult sentences for precise expression^[15]. Mechanical engineering English frequently adopts structurally complex long sentences to convey rigorous and sophisticated logical relationships. Due to the differences between English and Chinese, sentence division is typically used in Chinese translation to make the target text more comprehensible.

Example 3: It is a previously prepared deck of punched cards, or tape, that contains instructions that the computer needs to understand and execute the part-program instructions and also those it will receive from the fourth element, the post-processor program.^[14]

6. Translation Examples

Based on the linguistic features analyzed above, the writer will select several translation examples to compare the preliminary translation outputs generated by DeepSeek with the post-edited versions. Through this comparison, the study explores post-editing strategies for words and sentences in mechanical engineering English under the MTPE model.

Example 4: Often, the bore of such other components has to be chamfered to clear radii at the point where a shaft changes diameter.^[14]

DeepSeek's preliminary translation (Chinese) 通常, 这些其他部件的孔必须被倒角以清除轴直径变化处的半径。

Analysis of translation issues: Due to the differences between the two languages, the passive voice in English is typically translated into active voice in Chinese. However, DeepSeek's translation retains the passive structure “被倒角”(“be chamfered”), which does not conform to Chinese expression habits. Additionally, “shaft diameter” is inaccurately translated as “轴直径”(“axis diameter”) instead of the standard term “轴径”. Furthermore, “clear” is directly translated

as “清除” (“remove”), which fails to meet the high professionalism and rigor required in scientific and technological texts, necessitating human post-editing.

Post-edited version(Chinese): 通常情况下须将这类其他组件的孔进行倒角处理，以避免轴径变化处的过渡半径。

Example 5: A steady increase of load on a part will cause it to deform gradually.^[14]

DeepSeek’s preliminary translation (Chinese): 零件上负载的持续增加将导致其逐渐变形。

Analysis of translation issues: In Chinese, nominalized structures in English are often converted into verbal phrases to conform to syntactic habits. However, DeepSeek retains the nominalized structure in its translation, resulting in a version that is grammatically correct but stylistically inconsistent with Chinese technical writing norms, thus requiring post-editing.

Post-edited version(Chinese): 逐步加大零件上的负荷，会导致零件发生渐进性变形。

Example 6: Capacity of a machine component is related to the most severe service condition it can sustain without a change which will prevent the component from continuing its intended function.^[14]

DeepSeek’s preliminary translation (Chinese): 机器部件的容量与其在不发生任何变化的情况下能够承受的最恶劣的使用条件有关，这种变化将阻止部件继续发挥其预期功能。

Analysis of translation issues: The source sentence is a long complex one, containing an attributive clause (“it can sustain”) and prepositional phrases serving as adverbials and attributes. In Chinese, such lengthy, complex sentences are typically split into shorter ones. However, DeepSeek retains the English structure, producing a cumbersome translation that is hard for Chinese readers to parse—requiring post-editing.

Post-edited version(Chinese): 在保持原有状态不变的前提下，机器部件的容量与其所能承受的极端使用条件密切相关，一旦触发这种极端条件，机器部件将丧失其预期功能。

7. Conclusion

This paper focuses on the MTPE model and deeply explores the application effect of DeepSeek in the lexical and syntactic translation of mechanical engineering English, as well as the post-editing strategies. This paper points out the advantages of this model in translation practice, and through translation examples, it proves that the outputs of some machine translations represented by DeepSeek cannot fully meet the requirements of mechanical engineering English for translations. Translators need to carry out further post-editing work to ensure the accuracy and readability of the target texts, so as to accurately convey the professional information and connotations in such kind of corpus and meet the needs of communication and application in the professional field.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Zhang Yahui. Analysis of the Motivation and Mode of Overseas Mergers and Acquisitions in China’s Construction Machinery Industry under Economic Globalization—Taking XCMG Group as an Example[J]. Commerce Digest, 2019, (28): 15-16.
- [2] Wen Hong, Guan Xiaofei. Stylistic Features and Translation of Mechanical English[J]. Chinese Science & Technology Translators Journal, 2022, 35(04): 9-12.
- [3] Dai Guangrong, Liu Siqu. Neural Machine Translation: Progress and Challenges[J]. Foreign Language Education, 2023,

44(01): 82-89.

- [4] Feng Quangong, Cui Qiliang. Post-Editing Research: Focus Analysis and Development Trends[J]. Shanghai Journal of Translators, 2016, (06): 67-74+89+94.
- [5] Zhou Xinghua, Li Yiyang. An Inquiry into the Post- editing Functions of Computer- Aided Translation Software[J]. Journal of Beijing International Studies University, 2021, 43(05): 52- 65.
- [6] Jiang Yue. Linguistic Features of Mechanical English and Strategies for Improving Mechanical English Reading Ability[J]. Overseas English, 2020, (20): 131-132.
- [7] Li Xiaohong. Translation and Application of Mechanical Engineering English Terms[J]. Chinese Internal Combustion Engine Engineering, 2024, 45 (06): 10.
- [8] Li Suiting, Long Xiang. Exploration of the Characteristics of Mechanical Professional English and Its Translation Principles- From the Perspective of In- depth Education[J]. Journal of Guangxi College of Education, 2022, (03): 91-97.
- [9] Shi Ping, Editor. Mechanical Engineering Professional English (15th Edition)[M]. Harbin: Harbin Institute of Technology Press, 2014.
- [10] Li Keying. Translation of Business English Texts under the “CAT+MT+PE” Model[J]. English Square, 2024, (24): 15-18.
- [11] Hu Sike. The Generalization of Professional Terminology in Pragmatic Contexts[J]. Journal of Hunan University of Science and Technology(Social Science Edition), 2022, 25(02): 154-161.
- [12] Liu Ge. A Study on the Application of Functional Equivalence Theory in Scientific English Translation[J]. Journal of Harbin Vocational & Technical College, 2024, (01): 121-123.
- [13] Guo Kanjun. Nominalization Structures in Scientific English and Their Chinese Translation[J]. Journal of North China Electric Power University(Social Sciences), 2009, (01): 114-118.
- [14] Zhang Yue, Editor. English Course for Machinery Manufacturing[M]. Beijing: China Machine Press, 2007.
- [15] Lyu Yuting. Characteristics of Scientific and Technological Articles and Translation Skills[J]. Chinese & Foreign Entrepreneurs, 2016, (17): 253.

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