



Translating Civil Engineering Technical Terms: Strategies and Equivalence in English-Arabic Translation

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ترجمة المصطلحات التقنية في الهندسة المدنية: الاستراتيجيات والتكافؤ في الترجمة من الإنجليزية إلى العربية

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DOI: 10.5281/zenodo.13375522

Submission Date: 13 July 2024 | Published Date: 26 Aug. 2024

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Abstract

The translation of technical terms in civil engineering from English to Arabic poses considerable difficulties, particularly in developing nations where rapid advancements in engineering have created a linguistic gap between the two languages. The absence of corresponding terms in Arabic, combined with the fundamental structural differences between English and Arabic, presents significant challenges in the translation process. This study aims to investigate the translation strategies employed by translators, assess the levels of equivalence achieved, and analyze the correlation between the strategies used and the levels of equivalence attained. The hypothesis posits that translators primarily utilize reduction and expansion strategies to achieve textual equivalence while relying on literal translation for word-level equivalence. The dataset comprises five texts extracted from civil engineering manuals translated by five M.A. students at Tikrit University during the academic year 2022-2023. The analysis of these texts was conducted using Newmark's and Baker's models.

The findings indicate that translators predominantly depend on the literal translation strategy when converting civil engineering terms from English to Arabic, largely due to the lack of equivalent terminology in Arabic. This reliance results in a higher frequency of achieving equivalence at the word level rather than the textual level. Furthermore, the study underscores the importance of selecting appropriate translation strategies for accurate and effective translations of complex technical terms. It reveals that while literal translation typically leads to word-level equivalence, employing reduction and expansion strategies is more effective for achieving textual-level equivalence.

Keywords: Equivalence, Terminology, Scientific Translation, Technical Terms, Civil Engineering.

المستخلص

ان ترجمة المصطلحات التقنية في الهندسة المدنية من الإنجليزية إلى العربية تواجه صعوبات كبيرة، خاصة في الدول النامية حيث أدى التطور السريع في الهندسة إلى خلق فجوة لغوية بين اللغتين. إن غياب المصطلحات المقابلة في اللغة العربية، إلى جانب الفروق الهيكلية الأساسية بين الإنجليزية والعربية، يطرح تحديات كبيرة في عملية الترجمة. تهدف هذه الدراسة إلى التحقيق في تحديات و استراتيجيات الترجمة التي يستخدمها المترجمون، وتقييم مستويات التكافؤ المحققة، وتحليل العلاقة بين الاستراتيجيات المستخدمة ومستويات التكافؤ المحققة. تفترض الفرضية أن المترجمين يعتمدون بشكل أساسي على استراتيجيات الاختزال والتوسع لتحقيق التكافؤ النصي بينما يعتمدون على الترجمة الحرفية لتحقيق التكافؤ على مستوى الكلمات. تتكون مجموعة البيانات من خمسة نصوص مستخرجة من كتيبات الهندسة المدنية تمت ترجمتها بواسطة خمسة طلاب دراسات عليا في جامعة تكريت خلال العام الأكاديمي 2022-2023.

تم إجراء تحليل هذه النصوص باستخدام نماذج Newmark & Baker .

تشير النتائج إلى أن المترجمين يعتمدون بشكل كبير على استراتيجية الترجمة الحرفية عند تحويل مصطلحات الهندسة المدنية من الإنجليزية إلى العربية، وذلك بسبب نقص المصطلحات المعادلة في العربية. تؤدي هذه الاعتماد إلى زيادة تكرار تحقيق التكافؤ على مستوى الكلمات بدلاً من المستوى النصي. علاوة على ذلك، تؤكد الدراسة على أهمية اختيار استراتيجيات الترجمة المناسبة لضمان ترجمات دقيقة وفعالة للمصطلحات الفنية المعقدة. تكشف الدراسة أنه بينما تؤدي الترجمة الحرفية عادةً إلى تحقيق التكافؤ على مستوى الكلمات، فإن استخدام استراتيجيات الاختزال والتوسع يكون أكثر فعالية لتحقيق التكافؤ على المستوى النصي.

الكلمات المفتاحية: تكافؤ, مصطلحات, ترجمة علمية, مصطلحات تقنية, الهندسة المدنية

INTRODUCTION**Statement of the Problem**

The translation of technical words in civil engineering from English to Arabic poses a challenge due to the absence of terminological equivalence in the Arabic language. This problem is particularly widespread in developing nations, where the quick progress in engineering has led to a substantial disparity between languages. The scarcity of terminological parallels in Arabic presents a substantial barrier for translators, further complicated by the vocabulary and structural disparities between English and Arabic. Therefore, the urgent issue of identifying suitable equivalents for civil engineering terminology needs to be resolved.

The aim of this study is to deal with the following questions:

1. Are there certain methodologies that translators can employ for translating civil engineering technical terminology into English?
2. Does the choice of translation method for English civil engineering technical words into Arabic affect the degree of equivalency achieved?
3. Translators may face many difficulties when translating English civil engineering technical jargon into Arabic.

Aims of the Study

1. This study aims to investigate the translation strategies used by translators and identify which strategy they rely on when translating civil engineering technical terms from English to Arabic.
2. Assessing the degree of equivalence attained by translators when converting civil engineering technical terms from English into Arabic.
3. Examining the relationship between the translation strategy applied and the level of equivalence achieved in translating English civil engineering technical terms into Arabic.

Value of the Study

This study is expected to be valuable for translation students, as it sheds light on the significant problems that translators encounter when dealing with civil engineering technical terms. It will also be beneficial for professionals and specialists

in civil engineering fields, as it will aid in identifying terminological equivalents for English terms that are difficult to translate into Arabic. Furthermore, the study is valuable for Arab translators working in the technical fields, as it provides insights into the challenges of translating civil engineering technical terms and potential solutions.

1. Concept of Translation

The concept of "translation" is understood and defined in different ways by various linguists and researchers. Catford (1965:20) describes translation as replacing written content in one language (the source language) with equivalent written content in another language (the target language).

Nida and Taber (1982:12) define translation as reproducing the message from the source language in the receptor language, aiming for the closest natural equivalence in both meaning and style. Their definition indicates that translation involves conveying a message from the source language (SL) to the target language (TL), ensuring that the translation reflects the intended meaning of the SL.

Vermeer (1987:29) emphasizes that the goal is to create a written document tailored to a specific context, intention, audience, and conditions. Hatim and Munday (2001:6) view translation as the process of transferring a written text from SL to TL, conducted by one or more translators within a specific sociocultural context. Toury (1995:56) echoes this by stating that translation involves at least two languages and two cultural traditions.

Ilyas (1989:19) describes translation as a linguistic process that involves replacing a source text with a target text, usually across two or more languages. This process aims to achieve equivalence between the two texts by substituting the lexical and grammatical elements of the original text with their counterparts in the target language. Additionally, the phonological or graphological features of the source language are replaced with those of the target language.

According to Ghazala (2008:1), translation includes various processes and techniques aimed at accurately conveying the meaning of a source language text into a target language. This involves using (1) words or phrases that have direct equivalents in Arabic; (2) newly created words or terms when no existing equivalents are available in Arabic; (3) foreign words or terms transcribed into Arabic script to reflect their original pronunciation; and (4) foreign words or terms adapted to conform to Arabic pronunciation, spelling, and grammar.

2. Equivalence

The concept of equivalence has been a key focus for translation scholars because of its essential relationship with both the definition and practical application of translation. During the 1960s and 1970s, equivalence became a vital element in translation theories, representing the degree of similarity between the source text (ST) and the target text (TT). The main concern was the type and extent of this similarity, which led to the development of various forms of equivalence. Several important points have significantly influenced this discussion.

Munday (2001:36) first tackles the issue of semantic equivalence among words in different languages. He notes that "there is no full equivalence between code units," which means that concise messages in one language may need to be rephrased when translated into another language. He further explains that "the translator records and transmits a message received from another source," indicating that translation involves two equivalent messages in two different languages.

Nida (1964:159) proposes two main types of equivalence and expresses doubt about traditional terms such as 'literal,' 'free,' and 'faithful' translation. The first type, known as formal equivalence, emphasizes the source language (SL) and focuses on the communication itself, including both its form and content. In this approach, the message in the target language should align closely with the various elements of the SL.

The second type of equivalence, termed dynamic equivalence, concentrates on the receptor's language. This concept of equivalent effect suggests that the relationship between the receptor and the message should closely mirror the interaction between the original receptors and the message's content.

Baker (1992:11-12) merges linguistic and communicative approaches in her analysis. She distinguishes between equivalence in translation that may occur at the word level and above it. Baker notes that in the bottom-up approach to translation, the translator must first assess equivalence at the word level. As the translator evaluates the source language text (SLT), they look at individual words to find a direct "equivalent" in the target language (TL). She defines the term "word," recognizing that a single word can have multiple meanings in different languages and may represent a more complex unit or morpheme. Therefore, the translator must carefully consider various factors, such as number, gender, and tense, when working with a single word.

Pym (2018:37) notes that the concept of equivalence has been frequently referenced in the definition of translation. However, only a few authors have explicitly defined equivalence itself. This concept likely has a wide interpretation among theorists. Generally, it is seen as the result of successful translation, and its importance as a theoretical term is probably aligned with the theory that outlines what constitutes good translation. Equivalence signifies achieving the goals that an ideal translator should aim for. Nevertheless, this assertion merely restates the same idea: while equivalence is intended to clarify the meaning of translation, it appears that the definition of translation itself shapes our understanding of equivalence.

3. Terminology

The significance of terminology has only recently been recognized. The term "terminology" was coined in European languages at the end of the 18th century, but it gained a positive connotation in the mid-20th century. The practice of naming things and events has a long historical background.

William Zinsser (1980:117) points out that each register has its own vocabulary, which can be challenging for non-specialists to understand. He states, "Every profession has its growing arsenal of jargon to fire at the layman and hurls him back from its walls."

Terminology refers to the collection of terms that represent the fundamental concepts and principles of a specific field of study (Bahumaid, 2010). Sager (1997:25) defines terminology as the area of study focused on analyzing and classifying specialized concepts along with their corresponding language labels or phrases. These specialized knowledge units arise from cognitive processes and communication among experts within a particular linguistic community.

According to the "Webster's New World College" dictionary (2004), terminology is defined as a set of words used in a specific field, such as art or science. Essentially, it is the vocabulary relevant to that field as described by lexicographers.

Kuldashova (2019:386) explains that terminology is a field of study that examines the theoretical aspects of the names assigned to objects or concepts within a specific area of knowledge. It also explores how these terms are used in language and addresses issues related to translation, classification, and documentation concerning these terms.

4. Scientific Translation

Nowadays, scientific translation is considered one of the most important areas within the translation field, largely due to advancements in science. According to Oxford Dictionaries Online, science is defined as "the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment." The rapid development of science in Western countries and the emergence of new scientific terminology may pose challenges in finding suitable equivalents.

Krüger (2015:43) argues that specialist translation, particularly scientific translation, is generally more straightforward compared to literary translation. Authors of scientific texts often use technical language, or terminology, to effectively communicate their ideas. This specialized language ensures that scientific discourse transcends specific languages and can be universally understood.

Nida (1964) points out that translating scientific terminology from advanced Western nations into the languages of developing countries can present difficulties. Cabr and Sager (1999:8) define scientific terminology as having three levels: field, practice, and product. They view terminology as a discipline focused on specialized words, a practice that organizes terms based on principles, and a product consisting of terms related to a specific subject area.

Al-Smadi (2022) emphasizes the translator's role in accurately translating scientific texts. The main goal for scientific translators is to convey knowledge clearly, concisely, and accurately. He outlines nine essential criteria for scientific translators, including understanding the target audience, preserving the author's stylistic preferences, having deep subject matter knowledge, and possessing comprehensive background knowledge related to the source text. Additionally, translators must be proficient in both the source and target languages, ask insightful questions, work in a way suitable for publication, stay updated with current methods, and meet deadlines.

Brekke (2004:618-619) defines science as an ongoing, unrestricted effort to discover, describe, measure, and justify the fundamental patterns of the observable universe. Byrne (2006:8,11) states that the primary goal of technical and scientific translation is not only to accurately transfer information from the source language (SL) to the target language (TL) but also to ensure that recipients understand the information easily and effectively. Scientific translation encompasses all aspects of pure science, including theoretical and esoteric subjects. He identifies three key attributes—subject matter, type of language, and purpose—that differentiate this field of translation from others.

Ghazalla (2008:156) defines scientific translation as converting terms from one language to another in fields such as science and technology, covering topics like medicine, physics, chemistry, mathematics, and computer science. Al-Hassnawi (2010) describes the translation of scientific terms as a complex intellectual task that requires proficiency, intelligence, and expertise in both SL and TL.

Luu (2011) notes that translating terminology can be challenging for translators, especially when even specialized bilingual dictionaries fail to distinguish between a term's academic meaning and its common usage. Translating scientific and technical content for the Arab world presents several linguistic challenges. Seiny (1985) claims that terminology accounts for 40 to 60% of errors made by technical translators. Finding the appropriate equivalent word takes up about 50% of a translator's time. Thus, it is essential for agencies involved in translating scientific terms into Arabic to prioritize addressing these challenges.

5. Characteristics of Arabic Scientific Text

Each language has distinct linguistic traits that differentiate it from others, including vocabulary, sentence structure, syntax, style, and conventions. When translating, particularly in specialized or scientific contexts, it is crucial to produce texts that align with the norms of the target language (TL) and reduce any interference.

Javier (2009:75) defines interference as the addition of lexical, syntactic, cultural, or structural elements from other semiotic systems that are unfamiliar or absent in the target context. While languages do exhibit specific differences, they also share some similarities.

The features of scientific texts can be divided into three main categories:

1. **Lexical Features:** This includes the specialized vocabulary and terminology specific to scientific discourse. The words chosen must be accurate and reflect the concepts pertinent to the field.
2. **Syntactic Features:** This relates to how sentences are structured and constructed in Arabic scientific texts. Proper arrangement of words and phrases is essential for clarity and coherence.
3. **Graphological Features:** This encompasses the visual elements of writing, such as punctuation, formatting, and overall presentation style. These aspects enhance the readability and professionalism of scientific documents.

6. Technical Translation

Technical translation has been essential in enhancing human communication and the exchange of information for many years. As civilizations have evolved and technological advancements have grown, the demand for accurate and efficient translations of technical materials has become increasingly important. Researchers have highlighted the significance of technical translation in bridging different languages and cultures, ensuring the dissemination of scientific knowledge.

A review of the existing literature on technical translation reveals two common misconceptions surrounding this field. The first misconception pertains to the precise definition of the term, while the second misconception is the belief that scientific and technical translation are interchangeable.

Regarding the first misconception, Wright and Wright (1993:1) explain that technical translation refers to the translation of texts created in languages for special purposes (LSP), which are specialized language forms. Thus, translations from diverse fields such as economics, psychology, law, and engineering are all considered technical translations, including "technical terminology." In accordance with this definition, Ghazala (1995:156) defines technical translation as the process of translating technical and scientific terms across various disciplines, including medicine, physics, chemistry, mathematics, mechanics, technology, computer science, and other scientific fields. Byrne (2006:3) argues that these definitions do not differentiate between specialized and technical translation because "technical" specifically relates to technology and technological writings. The presence of unique or specialized vocabulary in a subject does not automatically classify it as technical. Schubert (2010:350) adds that the term "technical" refers specifically to the content of the documents rather than the tools used. Schubert asserts that the problem arises from the semantic ambiguity of the term "technical," which could pertain to information from technology and engineering or any other specialized field (Schubert, 2010:350). As a result, Newmark (1988:151) claims that in a broader sense, technical translation is synonymous with specialist translation, while in a narrower sense, it is a subset of specialist translation.

The second misconception is the belief that scientific and technical translation are synonymous. Newmark (1988:155) notes that scientific language emphasizes concepts, whereas technological language focuses on objects. This distinction highlights a clear relationship between the two fields. Similarly, Byrne (2006:8) argues that scientific translation encompasses the entire domain of pure science, including its theoretical, personal, and cognitive aspects, while technical translation pertains to the practical application of scientific knowledge. Indeed, scientific and technical translation differ in terms of subject matter, language, and purpose, as stated by Newmark and Byrne. However, both

categories share many similarities in their translation processes. This might explain why Olohan (2015:7) uses the term "scientific and technical" not to refer to the same type of translation but to indicate that they share specific features, challenges, or approaches. Therefore, discussions about technical translation are equally relevant to scientific translation.

7. Characteristics of Translating Technical Terms

Kellou and Ramdani (2020) explain that a technical term is a concise word or phrase that represents a specific aspect of a concept rather than a lengthy description. For example, the term "airplane" conveys a particular characteristic, namely the ability to fly. While technical terms may appear simple, they often serve as compound expressions or acronyms, enabling quick and efficient communication among technicians globally. Like other specialized terms, technical terms are defined by their precise meanings within their respective fields. The clarity of a term is connected to the simplicity of the concept it represents, which is evaluated within the framework of ideas specific to that specialty.

Olohan (in press, 2021:2) points out that the tasks of technical writing and translating technical documents are interconnected in various ways, going beyond their chronological sequence. If we consider practices as structured human activities made up of different components, it becomes clear that the practices associated with technical writing and translation share similarities in terms of materials used, required skills, and underlying motivations.

Gould (2008:2) notes that technical writers must maintain objectivity and ensure accuracy when addressing their subject matter. Their main goal is to document facts impartially and provide valuable, important, and reliable information that is easily understood by the audience. The language should be clear and straightforward, avoiding unnecessary descriptive words. To eliminate any ambiguity about the intended meaning or implications, verbs should be used in the active voice rather than the passive voice.

According to Gould (2008:21), effective technical writers must adopt the mindset of lifelong learners. Authors and translators of technical documents are highly skilled professionals and can often be viewed as interchangeable. To stay updated in their fields, they must thoroughly research relevant information and diligently follow recent developments. This practice allows them to remain aware of new terms and expressions emerging within their areas of technology and science.

8. Translation of Civil Engineering Technical Terms: stages and difficulties

Hall (1977:4-5) notes that engineering is a long-established profession that dates back to ancient times, and the integration of engineering skills has played a crucial role in the development of modern society. Febryanto, Sulyaningsih, and Zhafirah (2021) concur that there have been significant advancements in science and technology today, with numerous new tools and innovations emerging. This trend is likely to lead to the creation of new terminologies within various disciplines.

According to Watson (2024), the term civil engineering first appeared in the 18th century to distinguish it from military engineering, which had previously been the dominant field. Civil engineering is an important area within the broader engineering discipline, creating a demand for technical terms and translation. Translators face substantial challenges when converting books, articles, or reports into other languages due to the specificity of civil engineering terminology, which originated in English. The Arab world has a limited technical sector in civil engineering, making it difficult to find accurate equivalents for Western terms that convey the same meaning and purpose. Additionally, a single foreign term may have multiple meanings in Arabic.

This study explores the challenges and stages involved in translating technical terms, aiming to provide a thorough understanding of the complexities associated with this specialized type of translation.

8.1 Difficulties of Translating Technical Terms

Kellou and Ramdani (2020) highlight that technical translators encounter various challenges. Before commencing the translation process, it is crucial to conduct thorough research to fully understand any technical terminology and effectively tailor the content to the target audience. When addressing a broad audience, a different language is used compared to the specialized language aimed at a more elite group. After completing the research, translators face additional difficulties, the most notable of which include:

The presence of polysemous terms, where the translation varies based on context, which can jeopardize the precise technical meanings (Newmark, 1988).

The incorrect use of specific synonyms can lead to misunderstandings, and translators may use abbreviations without providing necessary explanations (Kellou & Ramdani, 2020).

Distinguishing between technical and descriptive terms can be challenging for translators. The original author might use descriptive language to explain a newly developed technical term or use it as a synonym to avoid redundancy (Newmark, 1988).

Translators often struggle with dictionaries, which may not be frequently updated or improved, especially in the Arabic language. Machlab and Kobaya (2004) note that many technical dictionaries consist of direct translations or borrowed terms from other languages without adequate explanations or interpretations.

8.2 Stages of Translating Technical Terms

The process of technical translation demands accuracy and clarity. Horguelin (1966) identifies four key stages involved in this process:

1. Analysis Phase

The analysis phase is essential for the translation process and includes several critical components. To fully grasp the text and its unclear terminology, extensive reading is necessary. Understanding the context is vital for identifying the source, genre, subject matter, and target audience relevant to the translation. Additionally, documenting the required resources and methods is crucial for a thorough analysis.

2. Understanding Stage

The understanding stage consists of two parts, focusing on both comprehension and information delivery. Initially, the translator concentrates on the text itself. In the second part, the translator considers both the content of the text and the needs of the target audience.

3. Translation Task

After fully understanding the original material, the translator's responsibility is to convey the message by finding appropriate equivalents in the target language.

4. Review Process

The review process is generally essential and advantageous. It is most effective when conducted by a technical expert, as they are likely to identify any incorrect terms or ambiguities present in the translated text.

8.3 Data Analysis and Discussion:

In this section, five texts are chosen and distributed to five M A students at the Translation department / College of the Arts / University of Tikrit to find out which strategy they chose to render civil engineering technical terms into Arabic and which strategy they achieved accordingly. Inappropriate translations are also detected.

ST 1 "Over-vibration can be detrimental as it can cause segregation of the aggregate and **bleeding** of the concrete."

TT 1

- 1- يمكن أن يكون الاهتزاز الزائد ضارًا لأنه قد يتسبب في انفصال الركام ونضوح الخرسانة.
- 2- الاهتزاز الزائد عن الحد يمكن ان يحدد سبب فصل وتجميع تسريب الكونكريت .
- 3- يمكن ان يكون الاهتزاز الزائد ضارا لأنه قد يكون سبب في فصل الركام ونضوح الخرسانة.
- 4- الاهتزاز المفرط يمكن أن يكون مضرًا يمكن أن يتسبب في فصل المواد الكاشطة وتمرير المواد الخرسانية.
- 5- يمكن أن يكون التحجيم الزائد ضارًا حيث يمكن أن يسبب فصل الركام ونضوح الخرسانة.

The proposed Arabic translation of the English technical term "bleeding" is "نضوح".

Discussion

Translators 1,3 and 5 employ a synonym translation strategy that illustrates the essence meaning of the term effectively, where they translate the term into "نضوح". This strategy provided an appropriate translation for the achievement of equivalence at the word level.

Translators 2 and 4 translate the term as "تسريب" which means "leakage" in English. The translation does not accurately reflect the specific technical concept intended by "bleeding" within the context of the civil engineering field, thereby failing to achieve an accurate and appropriate conceptual and terminological correspondence due to a lack of knowledge in the field of civil engineering. This rendering fails to capture the precise meaning of the original term, leading to a lack of equivalence.

Table (1): Analyzing ST 1

Translators	The Strategy Used	Level of Equivalence Achieved						Appropriateness	
		Word Level	Above Word level		Grammatical Equi.	Textual Equi.	Pragmatic Equi.	Appropriate	Inappropriate
			Idioms	Collocation					
T 1	Synonym	+	-	-	-	-	-	+	
T 2									+
T 3	Synonym	+	-	-	-	-	-	+	
T 4									+
T 5	Synonym	+	-	-	-	-	-	+	

ST 2 “Buried pipes must support the loads due to gravity earth forces and **live loads.**”

TT 2

- 1 يجب أن تقاوم الأنابيب المدفونة الأحمال الناتجة عن قوى جاذبية الأرض والأحمال الحية.
- 2 يجب أن تكون الأنابيب المدفونة تحت الأرض قابلة لتحمل الأحمال الناتجة عن الجاذبية الأرضية والأحمال الحية.
- 3 يجب أن تتحمل الأنابيب المدفونة الأحمال الناتجة عن قوى جاذبية الأرض والأثقال الموجودة.
- 4 الانابيب المدفونة يجب ان تدعم الاحمال الناتجة عن قوة الجاذبية الأرضية والاحمال الحية.
- 5 يجب ان تحمل الانابيب المدفونة الأحمال الناتجة عن قوى الجاذبية الأرضية والاحمال الحية.

The proposed Arabic translation of the English technical term “live loads” is “الاحمال الحية”.

Discussion

Translators 1, 2,4 and 5 use a literal strategy. They translated the technical term “live loads” into Arabic translation as “الاحمال الحية” which translation successfully captured the technical sense of the term, achieving appropriate translation at word-level equivalence because they focused on the word meaning of the term, not the whole text.

Translator 3 fails to accurately render the technical term” live loads “into the TL, where the translator translates it into “الأثقال الموجودة” which means “existing weights,” thereby producing translations that are deemed inappropriate. This discrepancy highlights the complexity of translating specialized terms and underscores the need to enhance linguistic precision and domain-specific knowledge in the translation process.

Table (2): Analyzing ST 2

Translators	The Strategy Used	Level of Equivalence Achieved						Appropriateness	
		Word Level	Above Word level		Grammatical Equi.	Textual Equi.	Pragmatic Equi.	Appropriate	Inappropriate
			Idioms	Collocation					
T 1	Literal	+	-	-	-	-	-	+	
T 2	Literal	+	-	-	-	-	-	+	
T 3									+
T 4	Literal	+	-	-	-	-	-	+	
T 5	Literal	+	-	-	-	-	-	+	

ST 3 “**This** curve becomes horizontal as the critical stress approaches the yield strength of the material, and **the tangent modulus** becomes zero.”

TT 3

- 1- يصبح هذا المنحنى أفقيًا عندما يقترب الضغط الحرج من مستوى خضوع المادة ويصبح المماس صفرًا.
- 2- يصبح هذا المنحنى أفقيًا عندما يقترب الضغط الحرج من قوة خضوع المادة ويصبح معامل المماس صفرًا.
- 3- المنحني يصبح أفقي عند مناهج الشد الحرج الناتج وقوه المواد ومعامل المماس يصبح صفر.
- 4- يصبح هذا المنحنى أفقيًا عندما يقترب الإجهاد الحرج من قوة خضوع المادة ويصبح معامل الميل المماسي صفرًا.
- 5- يصبح هذا المنحنى أفقيًا عندما يقترب الإجهاد الحرج من قوة الشد المرنة للمادة وقد يصبح المماس صفرًا.

The proposed Arabic translation of the English technical term “tangent modulus” is “معامل المماس”.

Discussion

Translators 1 and 5 employ a reduction or deletion strategy where “the tangent modulus” is translated into ‘المماس’ that illustrates the essence meaning of the term effectively. Translators provide an appropriate translation; this strategy facilitates the achievement of textual equivalence.

Translators 2 and 3 employ a literal translation strategy that effectively preserves the technical essence of the term. They translate the term into “معامل المماس”, achieving equivalence at the word level. This success can be attributed to their concentration on the term's specific meaning rather than the text's broader context.

Translator 4 uses an expansion strategy where he/she adds to the TT the term ‘الميل’ that does not alter the essence meaning of the technical term. The translator provides appropriate translation and achieves equivalence at the textual level.

Table (3): Analyzing ST 3

Translators	The Strategy Used	Level of Equivalence Achieved						Appropriateness	
		Word Level	Above Word level		Grammatical Equi.	Textual Equi.	Pragmatic Equi.	Appropriate	Inappropriate
			Idioms	Collocation					
T 1	Reduction	-	-	-	-	+	-	+	
T 2	Literal	+	-	-	-	-	-	+	
T 3	Literal	+	-	-	-	-	-	+	
T 4	Expansion	-	-	-	-	+	-	+	
T 5	Reduction	-	-	-	-	+	-	+	

ST 4 “ Special structural walls constructed using precast concrete and unbonded post-tensioning **tendons.**”

TT 4

- 1- يتم انشاء جدران هيكلية خاصة باستخدام خرسانة مصبوبة مسبقا وقضبان ما بعد الشد غير المربوطة.
- 2- جدران هيكلية خاصة مبنية باستخدام الخرسانة الجاهزة وأوتار ما بعد الشد غير المربوطة.
- 3- جدران هيكلية خاصة مبنية باستخدام الخرسانة مسبقة الصب وأوتار ما بعد الشد غير المربوطة.
- 4- “يتم إنشاء جدران هيكلية خاصة باستخدام الخرسانة مسبقة الصب وأوتار ما بعد الشد غير المربوطة.
- 5- الجدران البنائية الخاصة المركبة باستخدام الكونكريت المصبوب وأوتار غير المربوطة بعد الاجهاد.

The proposed Arabic translation of the English technical term “tendons” is “أوتار”.

Translator one fails to convey the accurate meaning of the original text where he/she renders the term into “قضبان” which means “bars”. Additionally, it wasn’t possible to identify a translation strategy or approach to achieve equivalence.

Translators 2, 3, 4 and 5 use a literal translation method that effectively captures the core meaning of the term and translates it into “أوتار”. The translators seem aware of the technical terms in the field of civil engineering. Translators provide appropriate translation, and this strategy ensures equivalence is maintained at the word level.

Table (4): Analyzing ST 4

Translators	The Strategy Used	Level of Equivalence Achieved						Appropriateness	
		Word Level	Above Word level		Grammatical Equi.	Textual Equi.	Pragmatic Equi.	Appropriate	Inappropriate
			Idioms	Collocation					
T 1									+
T 2	Literal	+	-	-	-	-	-	+	
T 3	Literal	+	-	-	-	-	-	+	
T 4	Literal	+	-	-	-	-	-	+	
T 5	Literal	+	-	-	-	-	-	+	

ST 8 “The largest volume of HVFA concrete used in Australia was in the construction of the basement **slabs**”

TT 8

- 1- كان الحجم الأكبر من خرسانة الرماد المتطاير المستخدمة في أستراليا هو في بناء ألواح الطابق السفلي.
- 2- أكبر حجم من الخرسانة HVFA المستخدمة في أستراليا كان في بناء ألواح الطابق السفلي.
- 3- أكبر كمية من خرسانة HVFA المستخدمة في أستراليا كانت في بناء ألواح الطابق السفلي.
- 4- أكبر كمية من الخرسانة HVFA المستخدمة في أستراليا كانت في بناء ألواح الطابق السفلي.
- 5- الحجم الأعلى من أج في أف أي كونكريت المستخدم في أستراليا كان في تركيب قاعدة سلايس.

The proposed Arabic translation of the English technical term “slabs” is “سقوف”

Discussion

In the context of civil engineering, the term “slabs” carries a specific meaning which is “سقوف” that differs from its general usage. All attempts of the translators to provide an equivalent term resulted in mistakes. Therefore, no translation strategy can be detected, and no equivalence is reached.

Table (5): Analyzing ST 5

Translators	The Strategy Used	Level of Equivalence Achieved						Appropriateness	
		Word Level	Above Word level		Grammatical Equi.	Textual Equi.	Pragmatic Equi.	Appropriate	Inappropriate
			Idioms	Collocation					
T 1									+
T 2									+
T 3									+
T 4									+
T 5									+

9. Findings

Based on the previous analysis and discussions, it appears that the translators employ various strategies, resulting in different levels of equivalence, as outlined below:

1. The data shows that 64% of translations are appropriate, whereas 36% are inappropriate (refer to Table 6). This indicates a moderate level of success for translators in accurately translating technical terms in civil engineering.
2. Different strategies are employed to translate civil engineering technical terms into Arabic. Translators tend to favor the literal translation strategy the most, accounting for 63%. This is followed by the use of synonyms at 19%. Reduction is utilized in 13% of cases, while expansion is applied in only 6%, as illustrated in (Table 7).
3. For the level of equivalence achievement, Translators achieved two levels of equivalence: word level and textual level. The word level equivalence stands at 81%, making it the most used, while the textual level equivalence is at 19% (refer to Table 8). It appears that the most suitable form of equivalence for translating civil engineering technical terms is at the word level, given the complexity of these terms.
4. It appears that translators who employ literal translation attain equivalence at the word level. This suggests a connection between the translation strategy utilized and the specific type of equivalence achieved.
5. The analysis reveals that translators who utilize literal and synonym strategies are more likely to achieve equivalence at the word level, as they focus on the words rather than the overall text. In contrast, the textual level of equivalence is attained through expansion and reduction strategies. Therefore, there is a relationship between the translation strategies employed and the level of equivalence achieved.

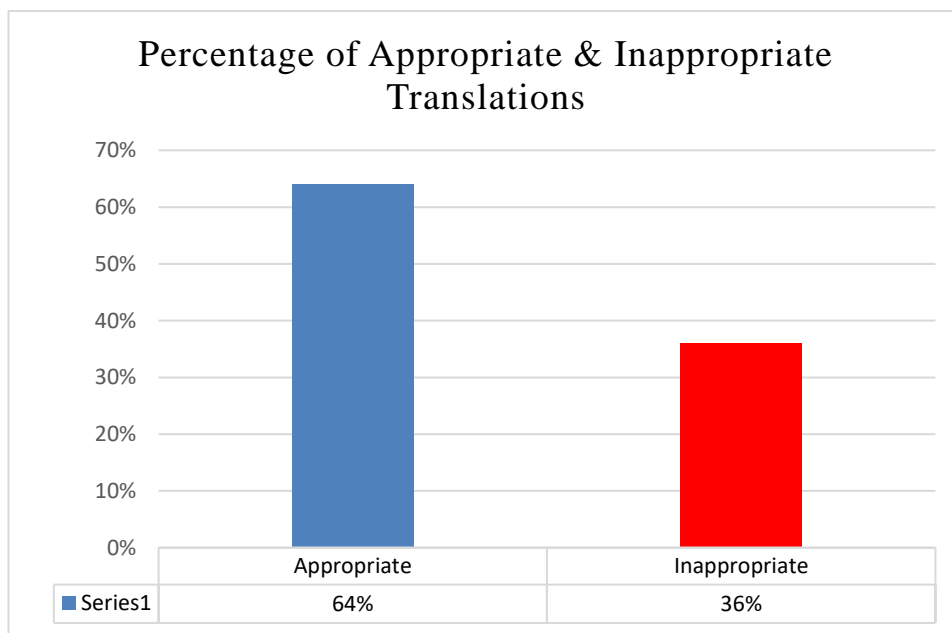


Figure 1: Appropriate and Inappropriate translation Percentage.

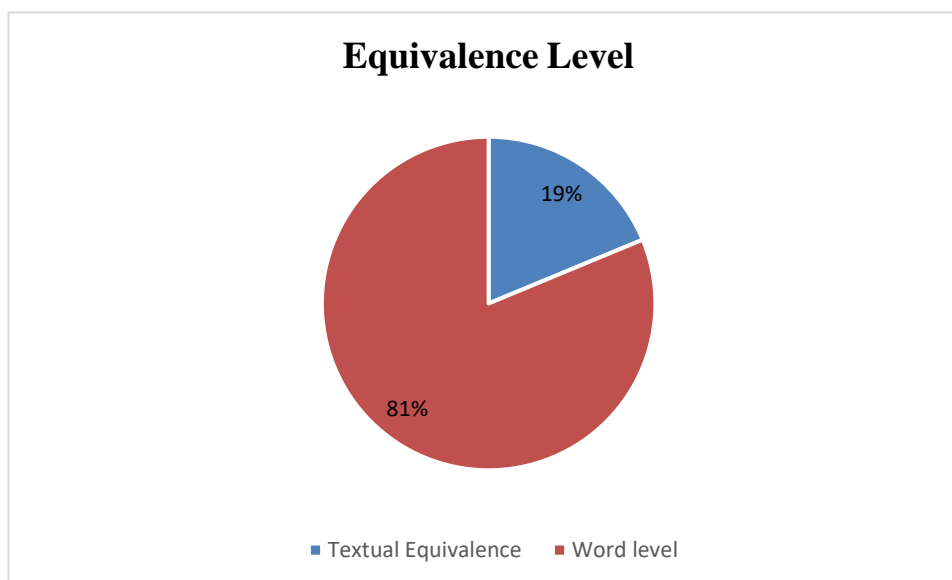


Figure 2: The Percentage of the Levels of Equivalence

Table (6) Percentage of appropriate and inappropriate translation

Total translators	Appropriate translations	Percentage
25	16	64 %
	Inappropriate translations	Percentage
	9	36 %
Total	25	100 %

Table (7) The Strategy Used in Translating STs

Strategy used	ST 1	ST 2	ST 3	ST 4	ST 5
Literal		1,2,4,5	2,3	2,3,4,5	
Expansion			4		
Reduction			1,5		
Synonym	1,3,5				

Table (8): Equivalence Level used in the Translation of each text.

Equivalence Level	ST 1	ST 2	ST 3	ST 4	ST 5
Word level	1,3,5	1,2,4,5	2,3	2,3,4,5	
Textual Level			1,4,5		

Conclusions

The analysis of the data from the previous chapter shows that translators mainly depend on the literal translation strategy when converting civil engineering terms from English to Arabic. This strong reliance on literal translation is largely due to the lack of equivalent terms in Arabic, which presents a notable challenge in achieving terminological equivalence. Additionally, the analysis indicates that translators are more likely to achieve equivalence at the word level instead of the textual level. This highlights the significance of choosing the right translation strategy for accurate and effective translations of complex technical terms. Furthermore, the study reveals that when translators choose a literal translation strategy, they typically attain word-level equivalence, while using reduction and expansion strategies facilitates achieving textual-level equivalence.

References

- Al-Hassnawi, A. R. A. (2010). Aspects of scientific translation: English into Arabic translation as a case study. Retrieved December 19, 2023, from <http://www.translationdirectory.com/article10.htm>
- Al-Smadi, H. M. (2022). Challenges in translating scientific texts: Problems and reasons. *Journal of Language Teaching and Research*, 13(3), 550-560. <https://doi.org/10.17507/jltr.1303.11>
- Bahumaid, S. (2010). The terminological issue in Arabic revisited: The case of discourse analysis terms. *Zeitschrift für Arabisch Linguistik (Journal of Arabic Linguistics)*, 52, 68-83.
- Baker, M. (1992) In *Other Words: A Coursebook on Translation*. London: Amsterdam! Philadelphia: John Benjamin
- Brekke, Magnar (2004): "Linguistic Aspects of the Translation of Scientific and Technical Texts", in Kittel, Harald; Frank, Armin P.; Greiner, Norbert; Hermans, Theo; Koller, Werner; Lambert, José; Paul, Fritz (eds); in association with House, Juliane; Schultze, Brigitte: *Übersetzung. Translation. Traduction. Ein internationales Handbuch zur Übersetzungsforschung. Volume 1*. Berlin/New York: de Gruyter, 619-635.
- Byrne, J. (2006). *Technical Translation: Usability Strategies for Translating Technical Documentation*. Dordrecht: Springer.
- Cabr, M. and Sager, J., (1999). *Terminology Theory, methods and applications*. Amsterdam: John Benjamins Publishing Company. <https://doi.org/10.1075/tlrp.1>
- Catford, J.C. (1965), *A Linguistic Theory of Translation*, London: Oxford University Press.

9. Febryanto, M., Sulyaningsih, I., & Zhafirah, A. A. (2021). Analysis of Translation Techniques and Quality of Translated Terms of Mechanical Engineering in Accredited National Journals. *Professional Journal of English Education*, 4(1), 116. <https://doi.org/10.22460/project.v4i1.p116-125>
10. Ghazala, H. (1995). *Translation as problems and solutions: A course book for university students and trainee translators*. Valetta, Malta: Elga.
11. Ghazala, H. (2008). *Translation as problems and solutions: A textbook for university students and trainee translators (Special ed.)*. Dar El-Ilm Lilmalayin. (Original work published 1995)
12. Gould, J. R., & Losano, W. A. (2008). *Opportunities in technical writing careers*, Revised edition. The McGraw-Hill Companies.
13. Hall, E. J. (1977). *English For Careers: The Language of Civil Engineering in English*. New York, NY: Regents Publishing Company, Inc.
14. Horguelin. P. (1966). La traduction Technique. *Meta*. V 11. N 1. 15-25. Les presses de l'université de Montréal, p 15-25 <https://doi.org/10.7202/003113ar>
15. Ilyas, A. (1989). *The Theories of Translation: Theoretical Issues and Practical Implication*. Mosul: Dar al-Kutub lil-Tiba' wa al – Nasher.
16. Javier, F. A. (2009). An overview of interference in scientific and technical translation ‘. *Journal of Specialised Translation*, 11, Jan. pp. 75-87
17. Kellou, Y., & Ramdani, A. (2020). Translation of Technical Terms: Case Study of Software Engineering Terminology from English into Arabic. *TraductionEtLangues*, 19(1),204-217. <https://doi.org/10.52919/translang.v19i1.411>
18. Krüger, R. (2015). The interface between scientific and technical translation studies and cognitive linguistics: With particular emphasis on explication and implication as indicators of translational text-context interaction. Frank & Timme GmbH Verlag für wissenschaftliche Literatur.
19. Kuldashova, N. B. (2019). Theoretical viewpoints of linguists on terminology. *ISJ Theoretical & Applied Science*, 12 (80), 385-387
20. Luu, T.T. (2011). Strategies to Translate Information Technology (IT) Terms. *Theory and Practice in Language Studies*, 1(1), 1-7. doi:10.4304/tpls.1.1.1-7
21. Munday, Jeremy. (2001). *Introducing Translation Studies: Theories and Applications*. London and New York: Routledge.
22. Newmark (1988). *Approaches to translation*. Hertfordshire: Prentice Hall.
23. Newmark, P. (1988). *A textbook of translation*. New York: Prentice Hall
24. Nida, E dan Taber, C. (1982). *The theory and practice of translation*. Leiden: Ej Brill.
25. Nida, Eugene A. (1964). *Towards a Science of Translating*. Leiden: E. J.Brill.
26. O’Grady, William and Dobrovolsky, Michael and Katamba, Francis. 1997. *Contemporary Linguistics*. Newyork: Longman Olohan (in press). *Translating Technical Texts*. In K. Malmkjær (Ed.), *Cambridge Handbook of Translation* Cambridge University Press.
27. Olohan, M. (2015). *Scientific and technical translation*. New York: Routledge.
28. Pym, A. (2018). *Translation and Text Transfer: An Essay on the Principles of Intercultural Communication (Revised ed.)*. Intercultural Studies Group. (Original work published 1992) ISBN 978-84-613-8543-0.
29. Sager, Juan. 1997. Term Formation. In *Handbook of Terminology Management*, edited by S. E. Wright and G. Budin, 25–41. Amsterdam/Philadelphia: John Benjamins
30. Sieny, M. (1985). Scientific Terminology in the Arab World: Production, Co-ordination, and Dissemination. *Meta: Journal des Traducteurs/Meta: Translators' Journal*, 30 (2), 155-160. DOI:10.7202/004142AR
31. Toury, G. (1995). *Descriptive Translation Studies – and beyond (Revised edition)*. Amsterdam: John Benjamins.
32. Vermeer, H. J. (1987). What Does It Mean to Translate? *Indian Journal of Applied Linguistics*, 13, 25-33.
33. Wright, S. E., & Wright, L. D. (1993). *Scientific and technical translation*. Amsterdam/Philadelphia: John Benjamins.
34. Zinsser, W. K. (1980). *On Writing Well: An Informal Guide to Writing Nonfiction (2nd ed.)*. London: Routledge
35. Watson, J. Garth (2024, January 5). civil engineering. *Encyclopedia Britannica*. <https://www.britannica.com/technology/civil-engineering>
36. Webster's New World College. (2004). *Terminology*.

CITATION

Mustafa G.G., & Suha R.H. (2024). Translating Civil Engineering Technical Terms: Strategies and Equivalence in English-Arabic Translation. In *Global Journal of Research in Education & Literature (Vol. 4, Number 4, pp. 76–88)*. <https://doi.org/10.5281/zenodo.13375522>