

T.C.
İSTANBUL 29 MAYIS ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
MÜTERCİM VE TERCÜMANLIK ANABİLİM DALI

THE USE OF MACHINE TRANSLATION IN HIGH-STAKES TEXTS: A CASE
STUDY ON GUIDELINES FOR NATURAL DISASTERS
(YÜKSEK LİSANS TEZİ)

Mehmet Kaan SEYRATLI

Danışman:
Prof. Dr. Işın ÖNER

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TEZ ONAY SAYFASI

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Mütercim ve Tercümanlık Anabilim Dalı Çeviribilim (İngilizce) Tezli Yüksek Lisans Programı'nda 200520YL04 numaralı Mehmet Kaan SEYRATLI'nın hazırladığı “*The Use of Machine Translation in High-Stakes Texts: A Case Study on Guidelines for Disasters*” konulu yüksek lisans tezi ile ilgili tez savunma sınavı, 07/05/2024 günü (16:00 – 17:00) saatleri arasında yapılmış, sorulan sorulara alınan cevaplar sonunda adayın tezinin başarılı olduğuna oy birliği ile karar verilmiştir.

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BEYAN

Bu tezin yazılmasında bilimsel ahlak kurallarına uyulduğunu, başkalarının eserlerinden yararlanılması durumunda bilimsel normlara uygun olarak atıfta bulunulduğunu, kullanılan verilerde herhangi bir tahrifat yapılmadığını, tezin herhangi bir kısmının bu üniversite veya başka bir üniversitedeki başka bir tez çalışması olarak sunulmadığını beyan ederim.

Mehmet Kaan SEYRATLI

07/05/2024

ÖZ

Hızla gelişen yapay zeka ve makine öğrenimi teknolojileri, çevirmenler arasında iş kaybına ilişkin endişelerin artmasına neden olmuştur. Bu endişeye yanıt olarak bu çalışma, DeepL Translator ve Google Translate'in Türkçe doğal afet kılavuzlarını İngilizceye çevirirkenki performansını değerlendirmekte ve hem makine çevirisi çıktılarının bu tür yüksek riskli bağlamlarda kullanılıp kullanılamayacağını araştırmaktadır. Çalışma ayrıca makine çevirisi çıktılarındaki hataların düzeltilmesinde ön düzenleme işlemlerinin etkinliğini araştırmaktadır. MQM (Multidimensional Quality Metrics) kullanılarak, her iki makine çevirisi sisteminin ham çıktıları üzerinde kapsamlı bir analiz gerçekleştirilmiştir. Ardından, tespit edilen her hata için ön düzenleme stratejileri geliştirilmiştir. Bulgular, her iki sistemin de beklenenden daha az hata üretmesine rağmen, makine çevirisi çıktılarında “majör” ve “kritik” düzeylerinde hatalar bulunduğunu ortaya koymakta ve kara kutu nöral makine çevirisi sistemlerinin tahmin edilemez doğasının altını çizmektedir. Terminoloji kategorisindeki hatalar haricinde, ön düzenlemenin çeviri hatalarının önemli bir kısmının giderilmesinde etkili olduğu görülmüştür. Sonuç olarak, bu çalışma mevcut makine çevirisi sistemlerinin gelişmiş kabiliyetlerine rağmen, insan çevirmenin çeviri sürecindeki vazgeçilmez rolünün altını çizmektedir.

Anahtar Kelimeler: Makine Çevirisi, Yüksek Riskli Metinler, Hata Sınıflandırması, Ön Düzelti, Multidimensional Quality Framework, Nöral Makine Çevirisi

ABSTRACT

The rapidly evolving artificial intelligence and machine learning technologies have led to growing concern among translators regarding potential job displacement. In response to this concern, this study evaluates the performance of DeepL Translator and Google Translate in translating Turkish guidelines for natural disasters into English, and explores whether raw machine translation output can be used in such high-stakes contexts. Additionally, it investigates the effectiveness of pre-editing operations in correcting errors in machine translation outputs. Using the MQM (Multidimensional Quality Metrics) framework, a comprehensive analysis was conducted on the raw outputs of both machine translation systems. Then, pre-editing strategies were developed for each error. Findings reveal that while both systems produced fewer errors than expected, errors of “major” and “critical” severity levels were present in machine translation outputs, underscoring the unpredictable nature of black-box neural machine translation systems. Pre-editing was found to be effective in addressing a significant portion of errors, with the exception of errors in terminology category. In conclusion, this study emphasizes the indispensable role of human translators in the translation process, despite the advanced capabilities of current machine translation systems.

Keywords: Machine Translation, High-Stakes Texts, Error Annotation, Pre-editing, Multidimensional Quality Framework, Neural Machine Translation

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LIST OF ABBREVIATIONS

AFAD:	Afet ve Acil Durum Yönetimi Başkanlığı
ALPAC:	Automatic Language Processing Advisory Committee
BLEU:	Bilingual Evaluation Understudy
DQF:	Dynamic Quality Framework
FAHQMT:	Fully Automatic High-Quality Machine Translation
METEOR:	Metric for Evaluation of Translation with Explicit Ordering
MIT:	Massachusetts Institute of Technology
MQM:	Multidimensional Quality Framework
MT:	Machine Translation
NMT:	Neural Machine Translation
PAHO:	Pan American Health Organization
SMT:	Statistical Machine Translation
TAUS:	Translation Automation User Society
TER:	Translation Edit Rate
TM:	Translation Memory

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1. INTRODUCTION

The developments in artificial intelligence through deep learning and machine learning are undoubtedly one of the major turning points in history. Affecting many industries, these technologies stand at the core of the newest industrial revolution, namely the fourth industrial revolution. Perhaps history truly repeats itself, with a wide range of occupations once again needing to adapt to the innate radical changes brought by the phenomenon known as the industrial revolution.

In the 18th century, it was mostly workers in the textile industry who had to come to terms with the adoption of machinery in factories. Today, the impact of the fourth industrial revolution is felt by almost every occupation one can think of. From design to finance, from manufacturing to customer service, artificial intelligence and automation technologies are used in various sectors. Unlike in the first industrial revolution, today's new technologies are not limited to performing non-cognitive, repetitive tasks; they also excel in more complex, high-knowledge tasks.

As part of the artificial intelligence revolution, growing interest in the development of machine translation (MT) services (e.g., Google Translate, DeepL Translator) has enabled anyone with access to the internet to have a fast, easy and free way to translate texts. MT has now become a very powerful tool, both for professionals and non-professionals. Professionals exploit MT to save precious time and increase their productivity. Non-professionals utilize MT in their daily lives as an aid to remove the language barriers in the cyber and real world. Companies are integrating MT into their workflow as a cost-effective solution for their multilingual needs.

Although current MT services do not guarantee perfect results, and their pre-existing limitations are still prevalent, they have shown substantial improvement in quality over the past few years. So much so, that there is now a growing belief that the translation profession is a dying one. Indeed, there is empirical evidence on the causality between automation and unemployment. Businesses have always been in search of cutting costs while increasing productivity, and automation is one of the best solutions for achieving this goal. However, to what extent the same causality applies to translation practitioners is

highly debatable. Catastrophic claims regarding the future of translators are mostly predictive. This makes it challenging to find a basis in scientific sources and empirical data. On the contrary, many studies indicate a positive outlook for the profession. US Bureau of Labor statistics projects a %4 growth for employment of translators and interpreters until 2032, about as fast as the average for all occupations. According to CSA and Nimdzi, industry size of the language service providers was \$64.7 billion in 2022, \$69.3 billion in 2023, and is expected to reach \$90.8 billion until 2027.

Up until today, the benefit of general technological development has not merely been “to translate” but “to aid the translator in the translation process.” Indeed, incorporation of MT into the workflow of professional translation environments stands as an industry standard. Besides widely-used platforms that provide free MT services, there are also specialized MT providers that focus on delivering customized MT systems. These MT systems are capable of delivering even better results by undergoing domain-specific MT training.

With the increasing incorporation of MT, the very nature of the translation task is changing. Translators now frequently collaborate with MT by pre-editing the source text and/or post-editing the raw MT output. Beyond pre- and post-editing, translators also undertake MT error annotation tasks, providing valuable feedback for MT development. These new business practices, driven by advancements in MT technology within the context of the fourth industrial revolution, are inevitably reshaping the traditional roles and responsibilities of translators.

While raw MT output can be used in some low-risk settings (e.g., social media), human judgment and intervention remains crucial in high-risk contexts, such as legal contracts, medical reports, safety guidelines, government documents, and technical specifications. Precision, accuracy, reliability, and actionability become critical in situations where the source text contains sensitive information. In such cases, errors in translation could have serious consequences. Therefore, high-stakes texts require the careful observation and intervention of a professional translator to ensure that the elements that constitute the meaning in the source text are accurately conveyed in the target

language. To achieve this, either the source text is pre-edited to improve the chances of MT to process the text effectively, or the MT output is post-edited to eliminate the errors, or both in conjunction, thereby avoiding any semantic and syntactic translation errors.

While recent advancements in MT quality surely was a significant step forward, there is still further potential for improvement, as MT technology is not yet flawless and it would be too optimistic to consider it as having reached its peak. Given the growing use cases of MT in various settings, the increasing reliance on MT brings forward the need to understand and enhance the performance of this technology.

1.1 Research Objectives

Texts aiming to inform and instruct people in the event of a disaster are an example of a high-stakes scenario where timely and accurate communication is vital for saving lives and minimizing damage. In situations where an individual does not know the source language and there is a scarcity of resources or time to obtain professional translation services, utilizing MT will become the only option. In this context, raw MT output should be free of critical errors and at least meet the “good enough” quality standard, ensuring that its recipients are able to take necessary actions. This thesis argues that MT cannot solely be relied upon for high-stakes contexts due to the unpredictable nature of MT, its potential for errors, and the crucial need for ensuring accuracy and preserving the intended meaning. Additionally, this thesis argues that the application of pre-editing techniques, or using controlled language when authoring high-stakes texts, may eliminate or reduce the errors on raw MT output, thereby enhance its reliability and effectiveness in cases where MT is the sole option for translation. In this regard, the present study aims to:

- 1) Assess the suitability of raw MT outputs for application in high-stakes contexts,
- 2) Investigate the impact of pre-editing on reducing errors in raw MT output within the context of guidelines for natural disasters

In pursuit of these objectives, this study will focus on analyzing the translation of

five Turkish guidelines for natural disasters published by The Disaster and Emergency Management Presidency (Turkish: Afet ve Acil Durum Yönetimi Başkanlığı, abbreviated as AFAD). Through a fine-grained error analysis, this study aims to document the capabilities of the state-of-the-art MT systems in translating error-sensitive texts, while exploring the challenges and opportunities they present.



2. LITERATURE REVIEW

2.1 The Evolution of Machine Translation: A Historical Perspective

The concept of MT dates back to 17th century when philosopher René Descartes proposed the idea of a universal language, a code designed to establish connections between words in different languages. He thought that a universal code in which different tongues share one set of symbols would simplify the process of decoding one language into another. However, his proposition was purely theoretical. The first real attempts at creating mechanical systems that could be used for translation were in the 20th century. There are two simultaneously patented devices regarded as definite precursors of MT.

2.1.1 Precursors of Machine Translation (1933)

In 1933, French engineer Georges Artsrouni received a patent for his invention, which he referred to as the “mechanical brain”. Artsrouni’s device was not exclusively for translation; rather, it was a general-purpose mechanical storage with facilities for retrieving and printing stored information. Because of its versatility, it saw great attention in France and even won a prize. Although not for translation purposes, various organizations contracted Artsrouni for their own versions of the device. However, from the beginning Artsrouni envisioned one of its primary applications as a ‘mechanical dictionary’ for producing rough word for word translations (Hutchins, 2004, 3).

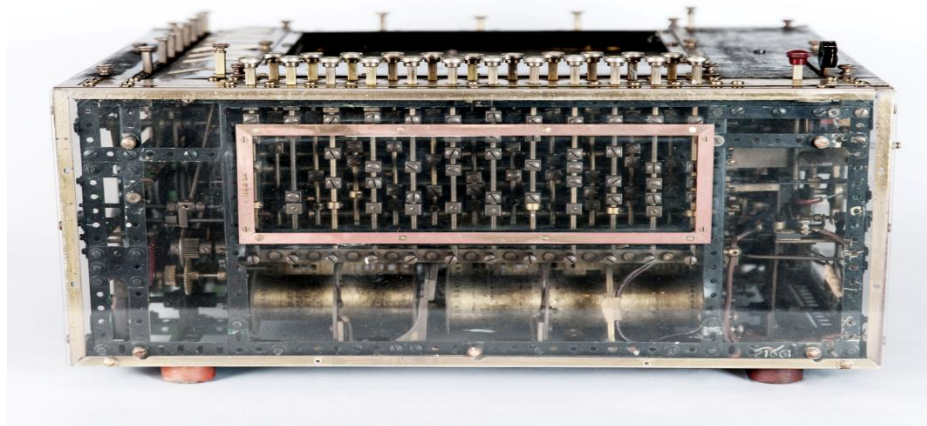


Figure 1 Artsrouni's Device

Source: <https://cafetran.freshdesk.com/support/discussions/topics/6000050879>

In the same year, Russian engineer Petr Petrovic Trojanskij was granted a patent for his device which he specifically designed for translation purposes. His machine accommodated six languages in it and was operated in three steps by operators. First, the operator located words of the source language. Second, the same operator found the categories of the chosen words and typed the codes associated with these words, which Trojanskij referred to as signs for logical parsing. Then, target words and their codes were photographed onto a tape by the machine. Third, based on the codes, the operator produced the target text, which actually is a kind of post-editing task. In principle, Trojanskij's device aligned with Descartes' idea. They both envisioned a universal set of symbols or codes for different languages, and Trojanskij successfully implemented this idea. The use of a "universal language" for automatic translation systems will also be seen in the initial attempts of researchers working with computer-based MT systems in the 1950s.

Considering the technological limitations of the 1930s, designing a machine that can undertake the task of translation (or at least aid in the process) is quite an innovative act. Fundamentally, both Artsrouni and Trojanskij were engineers with no prior knowledge on linguistics. While designing his device, Artsrouni did not think of a machine that can replace a human translator, but he believed that it could be beneficial in communication as his machine could be used as a multilingual dictionary with a relatively big memory. He envisioned its purpose for translation of phrases rather than words, which would mean an increase in accuracy. He did not tackle the basic problems of translation such as polysemy, synonymy, and idioms.

On the other hand, Trojanskij dedicated his efforts to creating a device specifically for translation purposes and in doing so, he took into account these key translation problems by proposing a table of homonyms in his patent application in 1933. His solution for homonyms was printing out all the possible outputs in the third step and leaving the work to the editor (post-editor) to come up with correct translation. When dealing with idioms, he proposed that they should either be left untranslated, replaced by non-idiomatic expressions, or an equivalent idiom. (Hutchins, 2004, 11)

2.1.2 Warren Weaver's Memorandum and the Birth of Machine Translation (1949)

Also knowing nothing official about, but having guessed and inferred considerable about, powerful new mechanized methods in cryptography - methods which I believe succeed even when one does not know what language has been coded - one naturally wonders if the problem of translation could conceivably be treated as a problem in cryptography. When I look at an article in Russian, I say 'This is really written in English, but it has been coded in some strange symbols. I will now proceed to decode.' (Weaver, 1949)

American mathematician and scientist Warren Weaver was the first to propose the idea of using computers to automate translation. The snippet above is from his memorandum in 1949, entitled "Translation," a proposition considered the most influential paper that set the stage for subsequent MT research (Hutchins, 1995, 3). Having significant exposure to the first examples of computers during World War II, Weaver believed that, with their immense speed, capacity and logical flexibility, computers could be utilized to process languages. Influenced by the success in war-time cryptography techniques, he imagined language as a code encrypted by the semantic and syntactic rules present in its parent tongue. If, through comprehensive study, all the rules that make up a language could be interpreted into algorithms, the computer could generate translations based on these algorithms. In other words, the challenge was to break the code of "certain invariant properties" (in Weaver's words) present in all languages, buried within their logical structure.

It should be noted that Weaver was well aware of a fact that still holds relevance today: MT through such methods was not applicable to all text types. In his proposal, Weaver assumes that there are two polar opposite properties to language depending on its intended use, 'logical' and 'alogical'. As he observed, "a translation procedure that merely handles a one-to-one correspondance of words" is insufficient for addressing the complexity of literary translation. In literary contexts (i.e. materials of "alogical language") where style is crucial, and problems of idioms, multiple meanings, and such are prevalent, "one must be pessimistic about" in terms of MT because a simplistic automation approach

would inevitably fail. Therefore, he emphasized that scientific and technical materials (i.e., materials of “logical language”) would benefit most from automating translation process.

Weaver’s ideas regarding the application of cryptanalytic techniques and his approach to language, viewed either as functional and logical or as literary and alogical, were met with great skepticism and even recognised as mistaken (Hutchins, 1986, 15; Kenny, 2018, 430). From a purely logical standpoint, Hutchins argues that when an English message is deciphered into English by an English-speaking recipient, there is no translation in the process (1986, 15). Knowing the language of the message allows the decipherer to make deductions during the deciphering process. Moreover, the predictability of the content of messages sent in military environments is a factor that limits the context. However, it is worth mentioning that Weaver’s intention was not to present definitive solutions, but to explore the possibilities, the ways and methods for a new technology that could benefit humanity. He aimed to bring to the agenda the prospect of developing a solution to address the world’s increasing need for translation at a time when computers were just emerging, with their use cases mostly limited to mathematical calculations. Weaver put forth his proposal in the hope of stimulating a more targeted research, and he indeed achieved this goal.

Weaver’s memorandum sparked interest towards MT development in the US, followed by rest of the world in the upcoming years. In the US research began at three universities: the University of Washington, the University of California, and the MIT (Massachusetts Institute of Technology). In 1951, MIT appointed Yehoshua Bar-Hillel as the first full-time researcher in MT. A year later, the first conference on MT took place at the MIT. Convened by Bar-Hillel, attendees of the conference consisted of scientists and government officials who are or may be interested in the field of “mechanical translation.” Alongside discussing the designed approaches and the initial experiences in MT, the conference aimed the creation of pilot machines with the intention of persuading the general public, as well as foundations and other organizations capable of supporting new ventures about the feasibility of MT. The following opening statement by Bar-Hillel proves that the complexity of languages and challenges associated with automating the translation

process were fully recognized:

completely automatic and autonomous mechanical translation with unique correlates to the original text is, in general, practically excluded, even with respect to scientific texts ... This being so, machine translation means no more than mechanical aids to translation. Only some kind of brain-machine partnership is envisaged.

(As cited by Hutchins, 1997)

Bar-Hillel's suggestion was that, in order to achieve acceptable results with MT, it is essential to include both pre-editing and post-editing tasks into the process, at least for the short-term pilot systems. In the long term, other researchers were optimistic about the achievability of fully automatic high-quality machine translation (FAHQMT). They believed that the path to achieving perfect results could be revealed through long-term computer-related technical research and statistical linguistics studies (Hutchins, 2001, 7).

2.1.3 The Georgetown-IBM Experiment (1954)

After two years, a pilot system came with the collaboration of IBM and the team led by Leon Dostert of Georgetown University, who was an attendee of the 1952 MIT conference. In January 1954, the system was publicly demonstrated at the New York IBM bureau, allowing both the general public and the press to witness it in action. A Russian scientific text containing 49 sentences and only 6 grammar rules was translated by the machine. Without any human interaction in the process (without any pre- or post-editing), the result was perfect, to such a degree that the demonstration triggered the first "hype cycle" in MT history, an in-joke among translators (Wiggins, 2017) that FAHQMT would be "achieved in three to five years". However, Hutchins argues that, as the machine was programmed to achieve a perfect translation for that preselected text, the experiment had little scientific value (1995, 4). Nevertheless, he considers it one of the most important events in the history of MT as it was enough to impress the audience, initiating large-scale funding of MT research.

2.1.4 The Decade of High Expectations and Disillusion (1954-1966)

The success of the Georgetown experiment had a global impact, extending the interest in MT beyond the borders of the US. Research began at almost any part of the world: in United Kingdom, USSR, Italy, France, Japan, China, Mexico, Germany, Sweden, Finland, Czechoslovakia, Hungary, Poland, Yugoslavia, and Romania (Hutchins, 1986). Researchers worldwide shared the belief that achieving success in MT simply required exploring the field, addressing existing problems, and that perfection was only a matter of time. The level of optimism during this decade is found in a 1960 book on MT written by Emile Delavenay: “the translation machine ... is now on our doorstep. In order to set it to work, it remains to complete the exploration of linguistic data” (121).

Two main groups emerged with different perspectives on MT development. One group, including the Washington and IBM teams, focused on quickly creating a working system. The other, including MIT and Harvard, prioritized foundational linguistic and technical research before attempting to create operational systems. Distinct strategies, such as direct translation (word-for-word) and interlingua (as suggested by Weaver in 1949), were adopted, with the direct translation approach favored by those aiming for practical systems in the near future. Additionally, hardware limitations, especially storage issues, posed challenges for many groups. A common goal of researchers was to overcome hardware and programming challenges to make MT systems economically viable (Hutchins, 1986, 106).

While early success fueled the expectations, technical and linguistic complexities became apparent over time. A report by Bar-Hillel in 1960 strongly argued that the goal of FAHQMT was “unattainable” (3). He suggested a more feasible goal, a shift towards human-machine collaboration. Bar-Hillel harshly criticized almost any MT group aiming to achieve FAHQMT. Instead, he called for a more realistic focus on “partially automatic MT with post-editing.”

2.1.5 The ALPAC Report (1966)

Despite worldwide collective research, MT development saw no visible success. In 1964,

the US government established the Automatic Language Processing Advisory Committee (ALPAC) to assess the progress on MT. In its famous 1966 report, ALPAC concluded that MT was slower, less accurate, and twice as expensive from human translation. This meant the cessation of funding for MT, at least in the US.

2.1.6 The Quiet Decade (1967-1976)

With the ALPAC report, the focus on MT research shifted away from the US to Canada and Europe. This shift is attributed to the bicultural government policy of Canada and the multilingual nature of the EU, both of which created a demand for translation beyond the capacity of the market (Hutchins 1995, 7). The shift resulted in the first commercial MT systems. In 1970, the US Air Force began using the SYSTRAN system, developed for Russian-English translation. In 1976, an improved version of SYSTRAN, capable of translating between French-English and English-Italian was in use by the Commission of the European Communities. At the same year, in Montreal, the TAUM (Traduction Automatique à l'Université de Montréal) project achieved significant success with the Météo system developed for the translation of weather forecasts. Besides a very restricted number of variations in the weather forecasting, the cognate nature of English and French led to this achievement.

2.1.7 Operational and Commercial Systems (1976-1990)

The mid-1970s was a turning point for MT (Hutchins 1986, 129). The continuous use of exemplary systems like SYSTRAN and Météo resulted in an increased interest on MT development. With a working principle similar to SYSTRAN, Logos Corporation developed a system for German-English translation. One of the most prominent systems, METAL (Mechanical Translation and Analysis of Languages) appeared in 1988 for German-English translation, funded by Siemens company of Germany. Other notable word-for-word systems, SPANAM and ENGSPAN, were operational in 1980 at the Pan American Health Organization (PAHO) for Spanish-English and English-Spanish translations, covering a wide range of subject areas. Additionally, various Japanese computer companies including Toshiba, Mitsubishi, and Fujitsu developed MT systems and

software for computer-aided translation.

Since its early days, MT development was mostly carried out by computer engineers, computational linguists, and mathematicians. In retrospect, this era is important in terms of recognizing the roles of translators in the operation, development, and improvement of MT systems. In a 1981 paper discussing the potential effects of MT on the people and the industry, Lawson states:

The most obvious change over the last year has been the much greater acceptance in MT circles of the translator's role... a positive translator role has come to the fore: the contribution of the translator to improvement of an MT system. Translators do know about translation, after all; and whether or not they can express this knowledge in the same ways as academic linguists, there seems now no doubt that translators can contribute to development, whether by supplying feedback from the postediting process, or by specific development work on a system... Higher-quality MT does indeed seem to demand the insight of the professional translator, as well as the skills of linguistics experts and computer scientists.

In line with Bar-Hillel's suggestions in 1960, MT in the 1980s began to be perceived not as a standalone system but as a human-machine collaboration, akin to a translation aid. A good example is SPANAM and ENGSPAN systems developed and used by PAHO, which heavily relied on the work of post-editors. The post-editing process in question "is done by professional translators who have been specially trained in the techniques of handling machine output... only an experienced translator will be aware of the words whose variable meanings are dependent on extra-linguistic content" (Vasconcellos and León, 1988, 194-195).

During the 1990s, there was an increased adoption of MT to address the rising need for extensive translations, particularly of technical documents, by commercial agencies, government services, and multinational corporations. In addition to MT systems, translators began recognizing the advantages of computers in their work. However, dissatisfied with the quality of MT output, translators sought computer aids that would allow them to be in command of the process rather than being slaves of automatic systems. An important development in this regard was the introduction of translation memory (TM) software by

Trados.

2.1.8 Rise of the Statistical Machine Translation (1990-2014)

Despite being dismissed in the late 1960s, statistical machine translation (SMT) experienced a revival in the 1990s. Instead of pre-specified linguistic rules as seen in rule-based MT, SMT relies on statistical methods and parallel bilingual corpora. Its core principle is searching through aligned source and target text segments in a vast database (~2 million words minimum) to find the closest translation for the input text. Crucial variables for its success are the size and quality of the database: the more human-translated documents, the better the results. The increase in computing power, digital data storage capabilities, and the advent of the World Wide Web had a significant positive impact on the rise of SMT in the 1990s (Koehn, 2010, 18), causing SMT to exceed the expectations of many researchers and dominate until mid-2010s.

2.1.9 Neural Machine Translation (2015-now)

Continuous advancements in the fields of machine learning and artificial intelligence introduced a new stage in MT: neural machine translation (NMT). NMT systems are state-of-the-art technology capable of analyzing not only individual sentences but also the context of the input text. NMT generates translations based on neural networks inspired by the structure and function of the human brain. Similar to SMT, it is trained on large, bilingual datasets. Through training, the system learns linguistic patterns and nuances. With the help of an attention mechanism and artificial intelligence, NMT systems can choose the best words based on how words relate to each other. This helps create more natural-sounding sentences, leading to improved MT outputs. Today, NMT stands as the preferred approach to MT (Rivera-Trigueros, 2021, 20), with its superiority over preceding models proven in numerous studies (Bentivogli et al., 2016; Stasimioti et al., 2020).

2.2 The Impact of Technology on Translators

Ever since the first ideas of automating the translation process appeared around 1950s,

great collective effort has been dedicated to achieve it. Despite early expectations of accomplishing this goal within three to five years, the difficulty of the task became apparent as research delved into the depths of the language ocean. Various approaches ranging from a reimagined 17th-century concept of *interlingua* to classical rule-based, example-based, corpus-based and statistical strategies, were explored. Some of the work bore fruit, some were criticised for trying to attain the unattainable.

In the meantime, computer technology made quantum leaps, data storage capabilities greatly improved, computing power exponentially increased, and the World Wide Web launched. These advancements led to two developments of particular interest to the translation profession: 1) With translation aids such as authoring tools, electronic dictionaries, TM software, computer-assisted translation tools, etc., emerging from the 1990s onwards, the use of technology became an integral aspect of the profession, assuming that the practitioner wants to stay relevant in a competitive market. As with many other jobs, computers became the workstation for translators. 2) Improved capabilities in storing the data of bilingual texts and effortless ways of circulating it through the internet played a crucial role in the revival and success of SMT, and subsequently, NMT. Over time, the quality of MT rose to a point that using it gradually became an industry standard since the growing demand for high volumes of translation could only be met by using MT as a solid booster for productivity.

As O'Brien observed (2012) about a decade ago, translation in the 21st century has become a human-computer interaction. She argues that technological developments play a transformative role for the profession, bringing both benefits and challenges. The first visible technological development that had a positive impact on translation was the introduction of TM tools in the 1990s. During those years, TM tools emerged as a solution to the increasing demand for translating large volumes of highly repetitive texts, particularly in the IT sector. TM tools therefore relieved the translators of "a tedious, time-consuming, and error-prone task" (O'Brien, 2012, 5) of finding direct matches from a previously translated document and replacing it onto a new one. While TM tools enabled a faster translation process with increased consistency, it also provided vendors with an

excuse to apply downward pressure on rates per word, as there was no need to translate previously translated words. However, this downward pressure is offset by higher volumes of work (O'Brien, 2012, 8).

The second and perhaps the most impactful technology has been machine translation. In the early days, use cases of MT were similar to those of TM. It worked especially good with texts containing basic, repetitive language with straightforward meanings. Although their limited capabilities required extensive post-editing, first MT systems had already found applications in some scenarios (e.g., Météo, ENGSPAN and SPANENG) as early as the 1970s. The success of SMT approach in 2000s, however, marked the beginning of a new era where the improved quality of MT would offer new possibilities for its application. Various studies proliferated, showcasing productivity gains through post-editing of MT output. The study of Plitt and Masselot (2010) involving twelve translators working on English to German, Italian, French and Spanish localization projects, found that post-editing of SMT output substantially increased translation productivity. Another study conducted on 21 candidate translators working on English-Chinese texts found that post-editing the MT output was faster compared to translating from scratch. Additionally, the study observed that candidate translators achieved better quality translations using MT output when translating into their weaker language (García, 2011, 5). The reason García defined the productivity gain as “marginal” is based upon the fact that test subjects were trainees, i.e., non-professionals with no prior experience in post-editing. García proposed that if even candidate translators gain at least some productivity through post-editing, professional translators who possess the skillset for post-editing could achieve significantly better productivity gains (230).

Onwards 2010s, MT and post-editing gained popularity in both practice and academic discourse. A survey conducted on 438 professional translators found that almost half of the respondents had already adopted MT, and a minority expressed that they were planning to use it in the future (Gaspari et al., 2015, 5). Beyond popularity, in fact, MT and post-editing were “moving away from a peripheral position to a more central place in the translation field” (Koponen, 2016, 12).

It can be said that after Google introduced its NMT-based free translation engine to the general public in 2016, post-editing of MT output seems to have become an increasingly common business practice. As MT inevitably evolves alongside other translation technologies, post-editing of MT output is destined to become a permanent practice in translation workflows. Most certainly, it will gain even wider adoption in the upcoming years.

The fact that MT post-editing is becoming a standard practice means that in increasingly prevalent scenarios, translation is becoming a task carried out by the machines, whereas human translators, or post-editors, are the ones correcting the mistakes of the machines. This shift in agency naturally brings fear about machines replacing humans. The fear is further exacerbated by grandiose claims such as “MT has achieved human parity” (Hassan et al., 2018), implying that the human factor could be removed from the equation altogether. While the results of such studies that deem MT equal with the human translator (Hassan et al., 2018) deserve attention, the variables employed to generate such conclusions require equal, if not greater, attention. In replicating the aforementioned study, researchers found that the dataset was often permeated by intentional grammatical errors (translationese) that would favor MT on the assessment stage; the quality of MT output was assessed by “bilingual crowd workers” whose linguistic expertise and translation competence is questionable; human reference translations had issues, indicating that reference translations were conducted by non-experts (Toral et al., 2018). Additionally, Pym (2019, 2021) argues that the test concerns content, not form, and it concerns isolated sentences, not the whole text. He draws attention to the fact that the act of translating is more than dealing with the semantics of the source text. Therefore, the alleged “human parity” test could be very well interpreted as a modern-day imitation of the 1954 Georgetown-IBM experiment in its aim: generating headlines, and marketing.

Ironically, despite the time that has passed since the emergence of such discourses, quality continues to be a central and persistent concern in almost all MT research (Ragni and Vieira, 2021, 12). This ongoing focus on MT quality suggests that the capabilities of current MT systems to produce translations at a level comparable to human translators are

not universally accepted.

Pym (2021, 4) argues that “if the human can thus work efficiently with the machine, the very restricted claim of parity (sentences, content, without context) need not in itself spell the end of any profession. But it can change the way translators work.” The most visible change is happening at the very core of the practice. Translators who choose to work with MT can use MT output as a draft translation, serving as a starting point for their own work. Compared to the traditional way of translating from scratch, post-editing MT output significantly increases productivity. For language service providers, embracing MT means reduced costs, while for translators, embracing MT means they can work faster and more efficiently.

However, it is not possible to claim that these significant advancements in MT technology have had no negative effects on translators. As Vieira (2020) argues, the anxiety in surrounding translation practitioners due to improved MT might not be caused solely from the technology itself but also from how businesses handle it. Every new tool that speeds up the translation process can also be used as an excuse to exert downward pressure on rates. Just as the emergence of TM tools did in the past, today, MT triggers a similar reaction. Therefore, the real issue might lie in unrealistic expectations regarding productivity and a disregard for the limitations of MT. Moreover, this debate on translator’s outlook is fundamentally “part of wider trends that may affect human labor as a whole” (Ibid., 4).

2.3 Pre-editing

While state-of-the-art NMT systems are capable of producing fluent and idiomatic translations, human intervention is still necessary to ensure that the target text is suitable for its intended purpose. This intervention can take place either before the source text is input to the MT system, referred to as pre-editing, or after obtaining the raw MT output, referred to as post-editing, or through both operations in combination.

Pre-editing refers to “the use of a set of terminological and stylistic guidelines or rules to prepare the original text before translation automation to improve the raw MT

output quality” (Arenas, 2020, 4). Pre-editing involves addressing common challenges that MT systems face, such as:

- **Unknown words:** These can be typos, slang, or technical terms absent in the MT system’s training data. Pre-editing techniques such as spell-checking and normalization (converting non-standard language to standard forms) can be used to address unknown words.
- **Sentence structure:** MT struggles with sentences that do not conform to expected structures, such as ungrammatical, unidiomatic or overly complex sentences. Pre-editing approaches such as grammar checking and simplification aims to address this.
- **Ambiguity:** MT may misinterpret ambiguous words or sentence structures. Using controlled language with limited vocabulary and structure, and simplification techniques may help eliminate or reduce ambiguity.
- **Syntax differences:** Some languages have different word order than others. Techniques such as reordering words in the source language can improve MT output in such cases.

Another approach is the use of controlled language, which is closely related to pre-editing. Pre-editing is typically done after the source text has been authored, while the use of controlled language means the consideration of improving clarity for human readers, or enhancing the processability of language by computers during the authoring of the source text. Using controlled language is particularly beneficial if the source material is to be translated by MT into a number of different languages (Hutchins and Somers, 1992, 152).

In the past, pre-editing was a favored approach to get decent results from rule-based and statistical MT systems, which were prone to obvious and systematic errors in adequacy and fluency (Gijón and Kenny, 2022, 83). For instance, O’Brien and Roturier (2007) found that shortening sentences and applying certain rules, like correcting typos, semicolons, and question marks significantly improved English to German SMT output quality and reduced

the post-editing effort. Likewise, Miyata and Fujita (2017) found that most source sentences could be improved for a better SMT output, and pre-editing Japanese texts for English also improved quality when source text was translated into other languages like Chinese and Korean. However, with the advent of NMT, research on the effectiveness of conventional pre-editing rules showed contrasting results. Miyata and Fujita (2021) found minimal correlation between pre-editing and the need for post-editing in NMT outputs, suggesting that the types of edits that were beneficial for SMT, such as making sentences shorter and simpler, could be less beneficial for NMT. Instead, they proposed that focusing on clarity and explicit meaning, even if it lengthened the sentences in the source text, could be a more beneficial pre-editing approach when dealing with NMT.

2.4 Use of Machine Translation In High-Stakes Texts

It has been some time since MT systems have become indispensable tools that everyone needs due to the increasing demand for translation in a world where language barriers are dissolving. As Coffey (2009, 1) points out, MT systems can address translation needs “in situations where low-quality translation is better than no translation at all.” However, unfortunately, it is not possible to predict the myriad of potential issues that may arise from low-quality translation and how often these issues could threaten property or even lives. Thus, in high-stakes contexts, relying solely on raw MT output could be likened to taking a gamble.

While literature on the use of MT for high-risk contexts is limited, prominent studies often focus on its application within legal and medical domains. In medical contexts, the limitations of MT are mostly acknowledged, and it is mostly perceived as a “last resort” to meet the communication needs of individuals lacking language proficiency, particularly in emergency situations when an interpreter is unavailable (Vieira, O’Hagan and O’Sullivan, 2021, 12). Nevertheless, despite the recognition of MT’s limitations, its role as a “last resort” option in medical (and other) settings brings forth the need to enhance the performance of MT systems to ensure effective use when needed.

Although there are no documented cases where MT was formally identified as the

root cause of improper medical guidance or malpractice (Ibid., 7), it is worth considering the possibilities. For instance, in their case study evaluating Google Translate for translating emergency department discharge instructions in hospitals, Khoong et al. (2019, 3) found that Google Translate translated 92 percent of Spanish sentences and 81 percent of Chinese sentences accurately. Further, they discovered that some of the inaccurate translations had the potential to cause clinically significant harm, with higher rates observed in Chinese compared to Spanish. Therefore, Khoong et al. recommend that clinicians exercise caution in such contexts and employ clear communication practices, such as avoiding spelling errors, complex grammar, and medical jargon, to minimize the potential harm that may arise when using MT (Ibid., 3). Similarly, in their study focusing on evaluating the effectiveness of two automated translation tools, Turner et al. (2019, 11) found that both tools were deemed “not ideal for use” in medical contexts.

According to Vieira et al. (2021), current research “tends to underestimate the complexities of language use and translation” (11) in these domains. Using MT in high-stakes contexts requires its users to “weigh the benefits of the technology against the risks it may pose” (Ibid., 12). As there is little room for errors in high-stakes contexts, the mismatch between the performance of MT systems and unrealistic expectations of its users may result in undesirable outcomes.

To mitigate the risks of MT use in high-stakes medical contexts, Mehandru, Robertson and Salehi (2022) discuss the prospect of the development of domain-oriented MT systems, as an alternative to general-purpose commercial MT tools. While they discuss it for the domain they are associated with, the idea remains plausible for other error-sensitive contexts. Just as an interpreter specializes in different domains such as medical, law, or technical, different MT systems may be trained on different data sets to address the diverse needs arising in various domains, each with its own terminology.

2.5 Machine Translation Quality Assessment

Quality assessment plays a key role in the development and improvement of MT systems. However, assessing the quality of a translation, whether human or machine-generated, is a

challenging task. As Castilho et al. (2018, 2) points out, translation is a “complex, cognitive, linguistic, social, cultural, and technological process.” Given the complexity of languages, and subjective opinions regarding what constitutes “quality,” it is demanding to come up with a perfect, one-size-fits all method for the task. Consequently, the method that will be used for MT quality assessment varies to accommodate different needs across different domains (such as academia and industry) and for various purposes (such as translation criticism and MT development). However, it is possible to categorize MT quality assessment into two primary approaches: assessment based on human evaluation, and automatic metrics.

2.5.1 Quality Assessment Based on Automatic Metrics

Automatic evaluation is performed with the use of scripts or software to measure the quality of machine-translated texts with little to none human intervention. Typically, automatic metrics compare the machine-generated translation to one or more reference translations conducted by expert translators and calculate their score using linguistic criteria. It can be said that automatic metrics are able to provide more objective evaluations since they are based on a predefined criteria. For large-scale evaluation tasks, automatic metrics are preferred as they are faster and much more cost-effective. However, while they excel in speed, they may lack in granularity.

Various automatic metrics have been developed for MT evaluation. The most common metrics include Bilingual Evaluation Understudy (BLEU, Papineni et al., 2002), Metric for Evaluation of Translation with Explicit Ordering (METEOR, Lavie and Agarwal, 2007), and Translation Edit Rate (TER, Snover et al., 2006).

BLEU is described as “the de facto standard for most research purposes” (Castilho et al., 2018, 18). BLEU ranks an MT output by calculating the similarities between the machine-translated text and reference translation produced by an expert human translator, based on the number of matching n-grams (sequences of words or entries). The notion that there may be more than one good translation for a given source text is acknowledged by its designers. In this regard, its designers, Papineni et al. (2002) suggest that variations in

different good translations may come in the form of word choices and word order. Despite these variations, it is possible to distinguish a good reference translation from a poor one since the good translation will share many words and phrases with reference translations, but a poor translation will not. Accordingly, the primary task of BLEU metric is comparing n-grams and counting matches, with more matches resulting in a higher score, indicating a better translation.

METEOR evaluates translations by comparing them to reference translations and calculates their score based on word-to-word matches. If multiple reference translations are available, each translation is assessed separately against each reference, and the highest-scoring pair is selected. METEOR creates a word alignment between the MT output and reference translations and maps words based on various modules such as “exact” for identical words, “porter stem” for words with the same root but different prefixes or suffixes (e.g., “run” and “running”), and “WN synonym” for words that have similar meanings in WordNet (a lexical database for synonyms). Hence, an advantage of METEOR is its ability to assess the semantic similarity by considering not only what number of matching n-grams are present, but also synonyms and paraphrases.

TER counts the minimum number of edits needed to transform the MT output so that it exactly matches one of the reference translations. Possible edits are defined as insertion, deletion, substitution of single words, and shifts of word sequences. The TER score is calculated by dividing the number of required edits by the average words in the reference translation. Its limitations regarding accurately reflecting the semantic similarity between the reference translation and MT output is acknowledged. In this regard, its designers, Snover et al. (2006) suggests the production of custom reference translations for better results.

While automatic metrics offer quick and cost-effective quality assessment, they have limitations. They may not always capture the nuances of language or context accurately. Additionally, their effectiveness can vary depending on the language pair and domain. Therefore, it is best to use them alongside human evaluation to ensure comprehensive and reliable quality assessment.

2.5.2 Quality Assessment Based on Human Evaluation

Quality assessment based on human evaluation refers to the annotation of translation errors by human evaluators using pre-defined frameworks for error typology. Typically, human evaluators focus on two aspects: how well the translation conveys the original meaning (adequacy or accuracy) and how natural it reads in the target language (fluency or linguistic conventions). According to Popovic (2018, 5) this method of translation quality assessment is challenging for a few reasons. First, errors need to accurately show both the strengths and weaknesses of the MT system, which are crucial for the task and the languages used. Second, while more specific errors in more detailed taxonomies give more information, they are harder to identify. Third, the types of errors should include both linguistic and translation issues. It is possible to find two different frameworks developed for the error annotation task: the Multidimensional Quality Metrics (MQM, Lommel, Uszkoreit and Burchardt, 2014) and the Dynamic Quality Framework¹ (DQF).

DQF was collaboratively developed by members of the Translation Automation User Society (TAUS). It was introduced as an alternative to existing quality evaluation models, which Görög (2014, 4) described as “rigid” and “time-consuming.” The developers of DQF acknowledged that the definition of quality can vary depending on factors such as content type, purpose, and audience. Thus, a key feature of DQF was its dynamic nature, which offered a flexible approach to selecting the most appropriate evaluation model based on the unique requirements of each task. DQF, as an online platform, not only provided a detailed error taxonomy for error annotation but also offered other services, such as post-editing productivity testing by measuring edit distance, and comparing and ranking different MT systems. Later, based on the first versions of MQM and the TAUS DQF, both sides collaborated and created the DQF:MQM harmonized error typology. TAUS DQF error typology then became a subset of MQM, and eventually superseded by the MQM-Core.

The MQM (Lommel et al., 2014) is another comprehensive framework designed to

¹ <https://www.taus.net/resources/blog/everything-you-need-to-know-about-dqf>

evaluate the quality of translated texts. It was developed within QTLaunchPad project funded by the European Union. Similar to TAUS DQF, MQM offers a flexible error taxonomy for translation quality assessment. While it is primarily used for evaluating translated texts, MQM can also be used for evaluating source texts. Translation projects come in all shapes and sizes, and each project may have unique needs. Therefore, MQM does not enforce a single evaluation method but rather provides a structured framework with quality evaluation metrics. As of April 2024, the MQM framework includes 8 main categories and more than 100 subcategories. This layered structure allows for evaluations at different levels of granularity. It is possible to conduct a quick, overall assessment, and a more detailed analysis using subcategories.

It is relevant to consider the implications of these practices in translator training. Through a post-editing oriented human quality evaluation approach, Öner and Öner Bulut (2021) examined the performance of NMT systems in translating blog posts and movie reviews. The error annotation task was conducted by students within an MA program. Through questionnaires, the study examined the challenges and benefits associated with integrating MT-related activities within translation training. The study revealed that 90.9 percent of the students found error annotation to be beneficial for post-editing task, whereas 72.7 percent of the students perceived error annotation as a challenging task (Öner and Öner Bulut, 2021, 107-108). Öner and Öner Bulut conclude that, while there are difficulties in designing and implementing tasks that involve constant interaction and collaboration with trainees, the benefits include building confidence and awareness for trainees, as well as a sense of fulfillment and enrichment for trainers. The study brings forth the importance of much needed empowerment of human translators in the age of MT, and emphasizes innovative learning activities that enhance trainees' skills in error annotation and post-editing tasks.

3. METHODOLOGY

3.1 Research Design

This study will assess the performance of two MT systems in translating five Turkish high-stakes texts into English. The five guidelines will be translated by two MT engines: DeepL Translator and Google Translate. Through a fine-grained error annotation process based on the MQM framework, I will evaluate the errors present in the raw MT outputs, assessing their type, severity, and impact on the translation accuracy, reliability, and actionability. The presence of critical errors will indicate that the MT output is unsuitable for the task. Each segment containing errors will then undergo pre-editing of the source text to determine if the error can be resolved solely through error-specific pre-editing strategies.

3.2 Selection of Guidelines

The five guidelines selected for this study are published by Turkish Governmental Agency AFAD. The guidelines consist of 3147 words and are written for avalanche, earthquake, fire, flood and landslide disasters. These guidelines were chosen for various reasons. First, the performance of NMT systems relies heavily on the training data. A major challenge arising from this is that MT may perform poorly in low-resource languages such as Turkish, Armenian, and Farsi (Taira et al., 2021, 3) compared to high-resource languages such as English, German, Spanish, and etc. Turkish is considered a low-resource language for natural language processing (Aleçakır, Bölücü and Can, 2022, 2) and more research is needed to document and improve the MT performance in such languages. Second, while these guidelines may be easily understood by native Turkish speakers, their translation into English may present significant difficulties due to certain inherent factors of the source language and characteristics of the source text. The inability of general use MT engines to develop a goal-oriented translation strategy similar to that of a human translator, and their limitation to the literal content of the input text may pose significant challenges when translating these texts. The guidelines were not officially translated into English by AFAD. Therefore, I undertook the task of translating them independently to facilitate their accessibility and usage in this study. The source text and reference translation can be found

in Appendices A and D.

3.3 Systems and Tools

3.3.1 Machine Translation Systems

Since this study considers a scenario where there is neither time nor resources to obtain a professional translation service, and an easily accessible MT service is the only viable option for obtaining translation of the source materials, Google Translate and DeepL Translator is employed. Both Google Translate and DeepL Translator are well-known and freely available neural MT tools accessible to anyone with internet access.

3.3.1.1 Google Translate

Google Translate is perhaps the most well-known and widely used MT service since 2006. It is a neural MT system, and offers translations for more than 100 languages and supports various input methods including text, document, and speech.

3.3.1.2 DeepL Translator

DeepL Translator is a relatively newer neural MT system developed by German company DeepL SE. DeepL also supports the same input methods such as text, document and speech but its language pool is smaller compared to Google's. However, DeepL is known for its superior translation quality in terms of accuracy and fluency.

3.3.2 Error Annotation Based on Multidimensional Quality Metrics

For error annotation task, I used the latest version of MQM full typology². The guidelines provided by MQM advise that annotators should tailor their metrics based on the text type being evaluated and the purpose of the assessment, selecting only those issues types relevant to the research questions at hand. Consequently, metrics should be sufficiently detailed to address the specific research questions while remaining manageable enough for

² <https://themqm.org/the-mqm-full-typology/> (Accessed April 17, 2024)

the annotator to effectively apply during evaluation.

As advised by MQM guidelines, I customized the MQM full error typology and created a decision tree based on the errors I encountered in raw MT outputs. I discarded locale conventions, audience appropriateness, and design and markup main error categories as none of them were relevant to the materials used in this study. For main error categories, I decided to focus on accuracy, linguistic conventions (was fluency in previous versions of MQM), style, and terminology. Within accuracy main error category, I kept mistranslation, overtranslation, undertranslation, omission and untranslated subcategories. Within terminology main error category, I discarded the inconsistent with terminology resource subcategory as no term base is used during the translation phase. Within style main error category, I discarded organization style, third-party style, inconsistent with external reference, language register subcategories as they were not relevant for this study. Regarding linguistic conventions, I discarded whitespace, corpus conformance, pattern problem, sorting, character encoding, and non-allowed characters as such errors were not relevant during annotation.

The list below shows the customized MQM error tree for annotation:

- Accuracy
 - Mistranslation
 - Overtranslation
 - Undertranslation
 - Omission
 - Untranslated
- Linguistic Conventions
 - Grammar
 - Word form
 - Word order
 - Function words
 - Punctuation
 - Spelling
 - Duplication
 - Textual Conventions – Cohesion
 - Textual Conventions – Coherence
- Style
 - Awkward
 - Unidiomatic

- Terminology
 - Inconsistent use of terminology
 - Wrong term

For detailed definitions of the error categories and definition of severity levels, please see Appendices E and F.

The annotation task is typically conducted at segment level, and it involves assigning error categories to segments containing errors, along with their severity. Error severity levels refer to different degrees of seriousness for errors found in the translation. Severity levels include neutral, minor, major and critical, each with its own multiplier. Depending on the total number of errors, their severity, and the total word count of the MT output, various formulas³ are used to calculate the quality of a given translation project. The absolute penalty total represents the sum of all error type penalty totals. The per-word penalty total is calculated by dividing the accumulated absolute penalty total by the total word count of the MT output. The pass/fail rating of the MT output depends on project-specific requirements, but it may be influenced by two factors. The first factor is threshold value, a customizable value representing the overall quality score below which the MT output is deemed unsuitable for its intended purpose. The other factor is the presence or absence of critical errors. In this study, the fail/pass rating will depend on the presence or absence of critical errors.

³ <https://themqm.org/mqm-terminology/> (Accessed April 17, 2024)

4. FINDINGS

4.1 Error Analysis

This section outlines the identified errors in raw outputs of both MT systems. Each error in critical and major severity levels are discussed individually due to their significance. While minor errors are also important, not all are discussed individually due to their abundance. Instead, to provide insight, two examples of minor errors for each error type are presented. Detailed tables containing all errors with their subcategories can be found in Appendices G and H for DeepL Translator and Appendices I and J for Google Translate.

4.1.1 DeepL Translator

Table 1: Type, Severity, and Number of Errors In Raw MT Output of DeepL Translator

Error Type	Number of Errors	Neutral	Minor	Major	Critical
Accuracy	22	3	10	3	6
Linguistic Conventions	27	10	16	1	0
Style	14	1	13	0	0
Terminology	26	2	23	1	0
Total	89	16	62	5	6

4.1.1.1 Critical Errors of DeepL Translator

Table 2: First Critical Accuracy Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
Okulda sınıfta ya da büroda ise sağlam sıra, masa altlarında ve ya yanında; koridorsa ise duvarın yanına hayat üçgeni oluşturacak şekilde ÇÖK-KAPAN-TUTUN hareketi ile baş ve boyun korunmalıdır.	If in a classroom or office at school, the head and neck should be protected under or next to sturdy desks, desks or tables; if in a corridor, the head and neck should be protected by forming a life triangle next to the wall with the SQUAT-SLAM-HOLD-HOLD movement.	If you are in a school, classroom, or an office, form a triangle of life under a sturdy desk, table, or next to it, and protect your head and neck by performing the DROP, COVER and HOLD ON action; if you are in a corridor, form a triangle of life next to the wall and protect your head and neck by performing the DROP, COVER, and HOLD ON action.

The source text provides guidance on actions to take during an earthquake based on the reader's location. The most crucial piece of information is the universally recognized term for securing oneself during earthquake, known as “drop, cover and hold on.” This includes dropping to the ground, taking cover by getting under a sturdy object like a desk, and holding on to stand still until the earthquake subsides. While the information on where to perform the “drop, cover and hold on” action is conveyed in a somewhat comprehensible way, the error occurs in the most important part of the sentence. The output of DeepL mistakenly reads “squat-slam-hold-hold” instead of “drop, cover and hold on.” It is impossible for the reader to deduct what is meant by “squat-slam-hold-hold.” The first error is the inability of DeepL to translate this crucial term. The second error of relatively less importance, is the duplication of “desks” and “hold.”

It is worth mentioning that the source sentence length is 28 words, and the source text has grammatical mistakes and typos. It is a known limitation of NMT to have problems when dealing with long sentences. Obviously, grammar and typology errors will also contribute to production of poor translations.

Table 3: Fixing the First Critical Accuracy Error of DeepL Translator

Pre-Edited Source Text	DeepL Translator
Okulda, sınıfta ya da bürodaysanız sağlam sıra, masa altlarında veya yanında hayat üçgeni oluşturacak şekilde yere çök, kapan ve tutun hareketi ile başınızı ve boynunuzu koruyun; koridordaysanız duvarın yanına hayat üçgeni oluşturacak şekilde yere çök, kapan ve tutun hareketi ile başınızı ve boynunuzu koruyun.	If you are in a school, classroom or office, protect your head and neck by crouching, grabbing and holding in a life triangle under or next to a sturdy desk or table; if you are in a hallway, protect your head and neck by crouching, grabbing and holding in a life triangle next to a wall.

Pre-editing the source text by changing passive voice to active, reordering the conditional information regarding where to create a triangle of life based on the location, inserting the additional word “yere” which means “to ground” in front of “çök” to provide a more explicit meaning as “drop to the ground,” and using lowercase letters with commas in between the words as “çök, kapan, tutun” enabled a better MT output. Although the correct

term of “drop, cover, and hold on” is still not present, DeepL was able to come up with a term similar in meaning: “crouch down, grab and hold on.” It is challenging to get a decent output when the source sentence has a complex structure. Overall, pre-editing enabled DeepL to produce a more acceptable translation that conveys the intended action.

Table 4: Second Critical Accuracy Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
Mutfak, imalathane, laboratuar gibi iş aletlerinin bulunduğu yerlerde; ocak, fırın ve bu gibi cihazlar kapatılmalı, dökülebilecek malzeme ve maddelerden uzaklaşılmalıdır.	In places where there are work tools such as kitchens, workshops, laboratories; stoves, ovens and such devices should be turned off, and materials and substances that may spill should be removed.	If you are in an area such as kitchen, workshop or laboratory where there are appliances, turn off stoves, ovens, and similar appliances and avoid substances that may spill.

The source text provides guidance on earthquake preparedness for individuals in environments like kitchens, workshops, or laboratories equipped with appliances such as ovens and stoves, as well as potentially hazardous substances. These appliances and substances may pose risks if they are operational during an earthquake. Therefore, source text directs the reader to turn off any appliances and distance themselves from hazardous substances that may spill and come into contact with skin. While DeepL accurately conveys the instruction to turn off appliances, it inappropriately misinterprets the latter directive towards the end of the sentence. About substances that may spill, DeepL gives a wrong direction. MT output directs the reader to “remove” the substances, instead of “moving away” from them, which completely alters the intended action. For example, in a laboratory containing highly toxic chemicals, attempting to “remove” these substances directly could result in exposure and significant harm to one’s health. Additionally, the use of a semicolon in this text is compliant with neither source language nor target language norms.

Table 5: Fixing the Second Critical Accuracy Error of DeepL Translator

Pre-edited Source Text	DeepL Translator
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Table 5 - continue

Mutfak, imalathane, laboratuvar gibi iş aletlerinin bulunduğu yerlerdeyseniz ocak, fırın ve bu gibi cihazları kapatın, dökülebilecek malzeme ve maddelerden uzaklaşın.	If you are in places where there are work tools such as kitchens, workshops, laboratories, turn off the stove, oven and similar devices, and move away from materials and substances that may spill.
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Removing the unnecessary semicolon, and changing the voice from passive to active enabled DeepL to correctly interpret the information regarding hazardous substances, effectively resolving the error.

Table 6: Third Critical Accuracy Error of DeepL Translator

Seg.#	Source Text	DeepL Translator	Reference Translation
1	Havayı kesme:	Do not cut the air:	Smothering:
2	Örtme: Katı maddeler (kum, toprak, halı, kilim vb) ve kimyasal bileşikler (köpük, klor, azot vb) kullanılarak yanan maddenin oksijen ile temasının kesilmesi ile yapılan söndürmedir.	Covering: It is extinguishing by cutting the contact of the burning substance with oxygen by using solid materials (sand, soil, carpet, rug etc.) and chemical compounds (foam, chlorine, nitrogen etc.).	Covering: Extinguishing by cutting the contact of the burning material with oxygen using solid substances such as sand, soil, carpets, rugs, and chemical compounds such as foam, chlorine, nitrogen, etc.

To provide context, I also included the sentence that follows the error. Error occurs in the first segment. The source texts provides information about the procedures individuals should follow in the event of a fire. There are different methods for extinguishing a fire such as cooling, starving and smothering the flames. “Smothering,” which is the established term for removing the oxygen from the equation, is given in the source text as “havayı kesme.” However, DeepL interprets this as “do not cut the air.” This error, however absurd or trivial it may seem, could cause significant confusion for the reader. While the idea is to smother a fire by cutting its contact with oxygen, the MT output directs the reader to “not cut the air,” the opposite of the idea. While the information is conveyed in the following segment, the error occurring in the first segment significantly decreases the reliability of the

translation.

Table 7: Fixing the Third Critical Accuracy Error of DeepL Translator

Seg.#	Pre-edited Source Text	DeepL Translator
1	Havayı kesmek:	Cutting the air:

In Turkish language, depending on the vowel harmony rules and the last vowel of the verb stem, the suffixes -mek, -mak and -me, -ma (when appended to the verb stem) are used to form verbal nouns, which function as gerunds representing actions. Additionally, the same suffixes are also used to form infinitive verbs. In this context, the choice between -mek and -me depends on the writer's preference. However, -me and -ma suffixes are also used to form negative verbs in Turkish, which leads to an ambiguity for DeepL. For instance, in Turkish, "havayı kesme" can be interpreted as: "do not cut the air" or "cutting the air," and this is what DeepL struggles to discern. While it is a very distinct possibility for a native Turkish speaker to misunderstand the intended meaning, DeepL fails to comprehend what is really meant by "havayı kesme." Using the -mek suffix instead of -me resolves the ambiguity. Although the accurate term "smothering" may not be present, the general idea of the sentence remains comprehensible.

Table 8: Fourth Critical Accuracy Error of DeepL Translator

Seg.#	Source Text	DeepL Translator	Reference Translation
1	YANGIN SÖNDÜRME TÜPLERİNİN KULLANIMI;	USE OF FIRE EXTINGUISHERS;	HOW TO USE A FIRE EXTINGUISHER:
2	Pimi çek,	Pull the pin,	Pull the pin,
3	Ateşin kaynağına yönelt,	Direct it to the source of the fire,	Aim at the base of the fire,
4	Sık,	Frequently,	Squeeze the handle,
5	Süpür	Sweep	Sweep

To provide context, I included the segments prior to and following the error. The source text provides guidance on how to operate a fire extinguisher. The error occurs at the

fourth segment, where DeepL interprets “sık” as “frequently,” instead of “squeeze.” Since this piece of information directs the reader on the most basic response, the first line of action in the event of a fire, it holds significant value. The procedure consists of four steps and even has an established term as “PASS.” Pull the pin, aim at the base of the fire, squeeze the handle, and sweep the nozzle from side to side. Obviously, all four actions are intertwined, and they are equally important to each other. Therefore, accurately conveying all intended actions is crucial to ensure the safety of individuals in emergency situations. Failing to interpret a step of the procedure may result in improper use of the fire extinguisher, which may exacerbate the fire and endanger lives.

Table 9: Fixing the Fourth Critical Accuracy Error of DeepL Translator

Seg.#	Pre-edited Source Text	DeepL Translator
1	YANGIN SÖNDÜRME TÜPLERİNİN KULLANIMI:	USE OF FIRE EXTINGUISHERS:
2	Pimi çek,	Pull the pin,
3	Ateşin kaynağına yönelt,	Direct it to the source of the fire,
4	Tetiği sık,	Squeeze the trigger,
5	Süpür	Sweep

In Turkish language, “sık” is a polysemous word with two different meanings. It can function as an adverb, meaning “frequently.” It can also function as an imperative verb, when used without infinitive suffix -mak, meaning “firmly squeeze.” Describing the action as “tetiği sık” (squeeze the lever) instead of “sık” conveyed the intended action more effectively and eliminated the error. As Miyata and Fujita (2021) also pointed out in their study, focusing on explicitness by providing a more detailed description of the action enabled DeepL to correct the error caused by a polysemous word. Only visible issue is the use of the term “trigger” instead of “lever,” which is an easily ignorable minor terminological error.

Table 10: Fifth Critical Accuracy Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
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Table 10 - continue

Sağlam eşyaların altında ve ya yanında hayat üçgeni oluşturarak ÇÖK-KAPAN-TUTUN hareketini uygulayın.	Form a life triangle underneath or next to sturdy objects and practice the CRUMP-CAPTURE-HOLD.	Form a triangle of life under or next to sturdy objects and perform the DROP, COVER, and HOLD ON action.
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The source text provides guidance on what to do during a landslide if the reader is indoors. Once again, DeepL struggles what is meant by “çök, kapan, tutun,” which stands for “drop, cover, and hold on” action. This term describes the action to minimize the possibility of physical harm to the reader. DeepL comes up with a nonsensical translation for the action: “crump, capture, hold.” While where to take the action is interpreted accurately, the description of the action is missing, which causes a loss of the essence of the meaning. The translation of DeepL poses a risk of serious physical harm, as the reader will not be able to take the necessary action to protect themselves in the event of a landslide.

Table 11: Fixing the Fifth Critical Accuracy Error of DeepL Translator

Seg.#	Pre-edited Source Text	DeepL Translator
1	Sağlam eşyaların altında veya yanında hayat üçgeni oluşturarak ÇÖK, KAPAN, TUTUN hareketini uygulayın.	Form a life triangle under or next to sturdy objects and practice the CRUMP, TRAP, HOLD movement.
2	Sağlam eşyaların altında veya yanında hayat üçgeni oluşturun ve yere çökün, kapanın, ve tutunun.	Form a life triangle under or next to sturdy objects and crouch down, cover, and hold on.

In the source text, the term “çök, kapan, tutun” is written in uppercase with the aim of emphasizing the importance of the action. Additionally, there were hypens between these words. To simplify the source text, I removed the hypens and used commas instead. However, the issue persisted, as seen in the first row. This time, “çök” was translated as “crump” instead of “drop down,” and “kapan” was translated as “trap,” instead of “take cover.” Kapan is a polysemous word in Turkish, functioning as a noun meaning “trap” and an imperative commanding to “take cover.” Consequently, I had to make further

adjustments, as seen in the second row. I switched the verbal adverb “hayat üçgeni oluşturarak” (meaning “by forming a triangle of life”) to an imperative verb “hayat üçgeni oluşturun” (meaning “form a triangle of life”), then added “ve” (meaning “and”) to connect the following words. After that, I used a more polite form of imperative for the verbs by adding suffixes according to their major vowel harmony: “çökün, kapanın, ve tutunun.” At last, DeepL was able to accurately translate the terms as “crouch down, cover and hold on,” grasping the intended meaning.

Table 12: Sixth Critical Accuracy Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa ÇÖK-KAPAN-TUTUN hareketi ile başınızı ve boynunuzu koruyun.	If you do not have time to escape the flow of mud and debris, or if there is no sturdy structure to hide behind, protect your head and neck with the FALL-CAPTURE-HOLD.	If you do not have enough time to escape from the mudflow and debris or if there are no sturdy objects to take cover behind, protect your head and neck by performing the DROP, COVER, and HOLD ON action.

The source text provides guidance on the procedure to follow during a landslide. If the reader is unable to escape in time or find a sturdy object or structure to take cover behind, the source text advises them to protect their head and neck by performing the “drop, cover, and hold on” action. Once again, DeepL is unable to interpret the term “drop, cover, and hold on.” While the conditional information was translated accurately, the critical information on the description of the action to take was translated as “fall, capture, hold.” I was unsure whether I should have categorized the severity of the error as critical or major, since it is possible to consider “fall” a word similar in meaning to “drop.” In essence, both “fall” and “drop” may mean “dropping to the ground.” Additionally, although DeepL did not use the correct phrasal verb “hold on” and omitted the “on” particle, “hold” alone could be considered an accurate translation for “tutun.” Nevertheless, the MT output misses one of the three important terms for the action. Instead of (take) “cover,” DeepL

uses the word “capture,” which is an irrelevant word for the described action.

Table 13: Fixing the Sixth Critical Accuracy Error of DeepL Translator

Pre-edited Source Text	DeepL Translator
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa, başınızı ve boynunuzu korumak için yere çökün, kapanın, ve tutunun.	If you do not have time to escape the mud and debris flow or if there is no sturdy structure around to hide behind, crouch, cover, and hold on to protect your head and neck.

Reordering the source sentence to shift its meaning from “protect your head and neck with the drop, cover and hold on action” to “drop, cover, and hold on to protect your head and neck,” using lowercase letters with commas between the words instead of hypens, and using a more polite imperative form of the verbs by adding suffixes according to their major vowel harmony as in “yere çökün, kapanın, ve tutunun” enabled DeepL to accurately interpret the action as “crouch, cover, and hold on,” effectively resolving the error.

4.1.1.2 Major Errors of DeepL Translator

Table 14: Major Accuracy Errors of DeepL Translator

Seg.#	Source Text	DeepL Translator	Reference Translation
1	Çığa yakalanırsanız!	Caught in an avalanche!	If you get caught in an avalanche:
2	Sonra çevrenizde yardım edebileceğiniz kimse olup olmadığını kontrol edin.	Then check if there is anyone around you who can help.	Then, check if there is anyone around you who you can help.
3	Sel	Sel	Flood

(Note that the segments are numbered for referencing; they do not appear consecutively as listed here.)

In the first segment, DeepL translated “çığa yakalanırsanız!” as “caught in an avalanche!”, failing to convey the conditional statement as in “if you get caught in an avalanche.” Since the sentence is in a highly visible part of the document, the title, it is significant. This error

occurred because of the exclamation mark at the end of the source sentence. Pre-editing the source text by changing the exclamation mark to a colon as “çığa yakalanırsanız:” enabled DeepL to produce the same translation conducted by the human translator.

In the second segment, DeepL translated “sonra çevrenizde yardım edebileceğiniz kimse olup olmadığını kontrol edin” as “then check if there is anyone around you who can help.” The issue here is the misuse of pronoun “you,” the relative pronoun “who,” and their relation to the action. In the output of DeepL, the relative pronoun “who” functions as the subject of the verb “help.” In the reference translation, “who” functions as the object of the verb “help.” The correct translation should convey the idea that you are the one who can provide help, as in “check if there is anyone around you who you can help.” A single omission of a word inappropriately alters the intended meaning. Interestingly, when I tried reproducing the error, I discovered that DeepL is able to translate the sentence accurately when the source sentence is input alone. However, the error occurs randomly, only when there are other sentences in the input. My guess is that the error might be caused by the multiple suffixes in the clause “yardım edebileceğiniz.” As DeepL does not consistently produce the error, pinpointing the exact cause of the error and fixing it would require a closer inspection by the developers of the MT system.

In the third segment, “sel,” which stands for “flood,” was left untranslated. As the untranslated term appeared in a highly visible part of the document, the title, I classified it as a major error. Fixing it by pre-editing was not possible as the root cause of the error is not related to grammar or typology issues in the source text but rather to the terminology bank of DeepL.

Table 15: Major Linguistic Conventions Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
Sarsıntı sırasında bir tünelin içinde iseniz ve çıkışa yakın değilseniz; araç durdurulup aşağıya inilmeli ve yanına yan yatarak ayaklar karına çekilip, ellerle baş ve boyun	If you are in a tunnel during a tremor and you are not close to the exit, the vehicle should be stopped, go down and lie on your side, feet on your stomach, and protect your	If you are inside a tunnel during an earthquake and are not close to the exit, stop the vehicle and get out, lie down next to the vehicle, pull your knees to your chest, and

Table 15 - continue

korunmalıdır. (ÇÖK-KAPAN-TUTUN)	head and neck with your hands. (CRASH-CAPTURE-HOLD)	protect your head and neck with your hands. (DROP, COVER, and HOLD ON).
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The source text provides instructions on what to do if the reader is driving inside a tunnel during an earthquake. Obviously, the most important piece of information for the reader is to stop the vehicle, get out of the vehicle, lie beside the vehicle, and shield their head and neck with their hands. However, it is very difficult to follow the procedure in the output of DeepL. Not only does it inaccurately describe the suggested actions, but it also has major cohesion problems. After stopping the vehicle, the source text instructs the reader to “get out of the vehicle” whereas DeepL instructs to “go down” which is not idiomatic for exiting a vehicle. After exiting the vehicle, the source text instructs the reader to “lie next to the vehicle,” whereas DeepL omits “vehicle” and translates it as “lie on your side.” It is crucial for the reader to use the vehicle as protection against potential falling debris, as it serves as a sturdy object that can mitigate impact. The omission of the word “vehicle” could pose a serious risk of physical harm and it could therefore be classified as a critical error. However, it is somewhat understandable from the context that the action should be lying next to the vehicle. Another issue is the lack of cohesion between the described actions, such as “feet on your stomach” instead of the idiomatic and cohesive translation, “pull your knees to your chest.” Additionally, the translation of the term in brackets, “çök, kapan, tutun,” as “crash, capture, hold,” deviates from the correct terms, “drop, cover, and hold on.” Since the term in brackets serves more as a hint than an explicit instruction, I did not classify this as a critical error.

The source sentence is relatively long, consisting of 26 words when excluding the three words in brackets. Additionally, the procedure is given in passive voice in the source sentence, which DeepL struggles to translate effectively, severely affecting the comprehensibility of the translation.

Table 16: Fixing the Major Linguistic Conventions Error of DeepL Translator

Pre-edited Source	DeepL Translator
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Table 16 - continue

Sarsıntı sırasında bir tünelin içinde iseniz ve çıkışa yakın değilseniz: aracı durdurup araçtan inin, aracın yanına yatın, ayaklarınızı karnınıza doğru çekin ve ellerinizle başınızı ve boynunuzu koruyun.	If you are in a tunnel during a tremor and you are not near the exit: stop the vehicle, get out, lie down on the side of the vehicle, pull your feet onto your stomach and protect your head and neck with your hands.
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Pre-editing the source text by changing passive voice to active voice and inserting possessive suffixes for words such as “ayaklar,” “karnı,” and “ellerle baş ve boyun” as “ayaklarınızı,” “karnınıza,” “ellerinizle başınızı ve boynunuzu” enabled DeepL to produce an accurate and fluent translation, effectively resolving the errors.

Table 17: Major Terminology Error of DeepL Translator

Source Text	DeepL Translator	Reference Translation
Çukur alanlarda, binaların bodrum katlarına su basma tehlikesi yüksek olduğundan, bu türlü yerlerde bodrum yapılmamalı, su basman kotu yüksek tutulmalıdır.	Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and the water level should be kept high.	In low-lying areas, since there is a high risk of flooding in the basement floors of buildings, basements should not be constructed in such places, and the height of the plinth level should be kept high.

The issue lies in the mistranslation of the term “su basman kotu.” DeepL translated it as “water level,” instead of the accurate term “plinth level.” As it is an important term for preventing floods in building basements in low-lying areas, it holds significance. “Water level” is not an accurate translation. Given its specificity in building terminology, it was challenging to make DeepL come up with the term “plinth level,” and completely fixing the error was not possible. However, MT output can be improved by specifying the term in different words. Pre-editing the term “subasman kotu” to “bina taban seviyesi,” which is a rough description of the term meaning “building floor level,” enabled DeepL to translate it as “the floor level of the building should be kept high,” which is a more explicit, acceptable instruction.

4.1.1.3 Minor Errors of DeepL Translator

Neutral and minor errors were mostly flaws in fluency (given under “linguistic conventions” category in MQM terminology), unidiomatic or awkward style, and poor word choices that do not significantly affect the understandability of the information. Although they do not pose serious risks, they are still relevant and worthy of attention since they affect the overall quality of the MT output for the reader.

Table 18: Minor Accuracy Error of DeepL Translator (Example 1)

Source	DeepL Translator	Reference Translation
Eşya almak için zarar görmüş binalara girmeyin.	Do not enter damaged buildings to retrieve goods.	Do not enter damaged buildings to retrieve belongings.

DeepL overtranslated the term “eşya” as “goods” instead of the two possible accurate terms “belongings” or “items.” “Goods” is a more specific term referring to items, materials and consumable substances which are sold to the consumers. Pre-editing by inserting possessive suffix as “eşya-larınızı” (“your items” in Turkish) enabled DeepL to translate it as “belongings.”

Table 19: Minor Accuracy Error of DeepL Translator (Example 2)

Source	DeepL Translator	Reference Translation
Şehir içlerinde yeterince yağmur suyu kanalı olmalı ve bunların sürekli bakımları yapılmalıdır.	There should be enough rainwater channels in the inner cities and they should be constantly maintained.	There should be an adequate number of rainwater channels in urban areas, and their maintenance should be carried out regularly.

The issue here is the translation of “şehir içleri” as “inner cities”. While “inner cities” may refer to central areas of large cities, “şehir içleri” simply means “within cities” or “inside cities,” including all parts of a city. Pre-editing the source sentence by simplifying the term “şehir içleri” as “şehirler-de” (in cities in Turkish) effectively

resolved the error.

Table 20: Minor Linguistic Conventions Error of DeepL Translator (Example 1)

Source	DeepL Translator	Reference Translation
Bina yönetimince önceden belirlenen, mesken veya işyerinin özelliği ve büyüklüğüne göre uygun yangın söndürme cihazı mutlaka bulundurulmalı ve periyodik bakımları da yaptırılmalıdır.	A fire extinguisher suitable for the characteristics and size of the residence or workplace, determined in advance by the building management, must be available and periodic maintenance must be carried out.	Make sure to have a fire extinguisher suitable for the features and size of the residence or workplace determined in advance by the building management, and have it periodically maintained.

The minor issue in fluency here is that DeepL output fails to clarify whose periodic maintenance must be carried out. The phrase “periodic maintenance must be carried out” does not specify the object. The suffix -ları in the word “bakımları” is the third person plural possessive suffix referring to the maintenance of the fire extinguishers. However, DeepL misses this suffix, translating it as if the phrase was “periyodik bakım yaptırılmalıdır.” In compound sentences where an object is introduced in one part and referred to again in another, DeepL sometimes misses the functions of some suffixes and struggles to correctly interpret the reference. Fixing this error by pre-editing is possible by simply inserting “bunların” (“their” in Turkish) before the phrase, as in “bunların periyodik bakımları da yaptırılmalıdır”, which enables DeepL to translate the phrase as “their periodic maintenance must be carried out.”

Table 21: Minor Linguistic Conventions Error of DeepL Translator (Example 2)

Source	DeepL Translator	Reference Translation
DEPREM ANINDA BİNA İÇERİSİNDEYSENİZ;	IF YOU ARE INSIDE THE BUILDING DURING AN EARTHQUAKE;	IF YOU ARE IN A BUILDING;

The error falls under grammar - function words category. Using “the” in “the

building” implies a specific building, as if referring to a particular building that is already known or previously mentioned. In the given context, however, the emphasis is on being inside any building during an earthquake. Therefore, using “a building” is the appropriate translation, as it refers to any building without specifying a particular one. Pre-editing the source text by inserting the Turkish indefinite article “bir” before the object “bina” enabled DeepL to translate the phrase as “if you are in a building during an earthquake.”

Table 22: Minor Style Error of DeepL Translator (Example 1)

Source	DeepL Translator	Reference Translation
Kesinlikle panik yapılmamalıdır.	There should be absolutely no panic.	Never panic.

When it comes to using idiomatic expressions, MT mostly fails to deliver good results. The literal meaning of the source text is “one should definitely not panic” and DeepL translates it as “there should be absolutely no panic,” whereas the idiomatic translation conducted by human is “never panic.” The root cause of this error is the use of passive voice in the source sentence, coupled with DeepL’s tendency to translate it word-to-word. Since the use of passive voice is not something MT system is familiar with in the target language norms, the word-to-word translation approach results in an unidiomatic translation. Pre-editing the source text by converting the passive voice to active and replacing the word “kesinlikle” with a synonym as “asla” enabled DeepL to translate it as “never panic.”

Table 23: Minor Style Error of DeepL Translator (Example 2)

Source	DeepL Translator	Reference Translation
Kum: Yanıcı maddelerin oksijenle ilişkisinin kesilerek söndürülmesinde kullanılır.	Sand: It is used to extinguish flammable materials by cutting their relationship with oxygen.	Sand: Used to extinguish fires by cutting off the contact of the burning material with oxygen.

Once again, the word-to-word translation approach of the MT system results in an

unidiomatic translation. Describing the direct interaction or contact between flammable material and oxygen using the word “relationship” is almost absurd. While “ilişki” can indeed be translated as “relationship” in contexts involving humans, in the context of the source text, it requires a different translation. Pre-editing the source text by replacing the term “ilişki” with an alternative word “temas” enabled DeepL to translate the sentence as “by cutting off their contact with oxygen.”

Table 24: Minor Terminology Error of DeepL Translator (Example 1)

Source	DeepL Translator	Reference Translation
Diğer insanlar uyarılmalıdır. (ses, ıslık, düdük, korna, vb.)	Other people should be warned (voice, whistle, whistle, horn, etc.)	Warn other people. (using any sound, whistle, horn, etc.)

The word “whistle” has two meanings in Turkish. It can refer to “ıslık” which is the action of producing a sound with your lips, or it may refer to “düdük,” which is the object held to the lips and blown through to produce a loud, high-pitched sound. In English, both of these definitions are encompassed by the single term “whistle.” DeepL translates it literally and uses “whistle” for both terms. A more suitable translation for the term could have been “whistle pipe” to indicate the distinction between the two terms. However, the absence of this distinction does not significantly affect the understandability of information, as it is evident from the context that any available means to produce a sound to warn other people can be used. Fixing it by pre-editing, as in almost every error under terminology category, was not possible.

Table 25: Minor Terminology Error of DeepL Translator (Example 2)

Source Text	DeepL Translator	Reference Translation
KAPALI ALANDAYSANIZ;	IF YOU ARE IN A CLOSED AREA;	IF YOU ARE INDOORS:

Throughout the text, there were instances where DeepL translated the Turkish term

“kapalı alan” as “closed area” instead of the equivalent terms “enclosed space” or “indoors.” There is a subtle yet significant nuance between “closed” and “enclosed.” A domain expert would not use “closed area” when translating this term, as its literal meaning is completely different from the term used in the source text. “Closed area” implies an area where passage of any kind is prohibited. However, it is understandable from the context what is meant by “closed area.” Fixing this specific terminology error was possible by inserting the article “bir” (a/an article in Turkish) before “alan.” When input as “kapalı bir alan,” DeepL is able to differentiate between “closed” and “enclosed” area.

Fixing terminology errors under the “wrong term” category was challenging, primarily due to the root cause being the word-to-word translation decisions of the MT system. Out of 21 identified wrong term errors, I was able to fix only four. Each fixable error required a unique approach. For instance, in one instance DeepL translated “yamaç eğimi” as “slope slope” instead of “slope gradient.” To address this error, I clarified the term by inserting “ölçü” (size or measurement in Turkish) after it. “Yamaç eğimi ölçüsü” provided a more explicit meaning, enabling DeepL to use the correct term “slope gradient.” In another instance, DeepL translated “toplanma noktası” as “rally point” instead of the correct term “assembly area.” Rally point is a term more commonly used in military environments and is not appropriate in this context. To address this issue, I replaced it with a synonymous word, “toplanma alanı,” which enabled DeepL to use the correct term. However, not all wrong term errors can be fixed solely through pre-editing means, as some are inherently limited by the structure of the sentence. The same applies to the “inconsistent use of terminology” error category, as establishing consistency when the MT system uses different words for a single term at different points of the document extends beyond the capabilities of the pre-editor.

4.1.2 Google Translate

Table 26: Type, Severity, and Number of Errors In Raw MT Output of Google Translate

Error Type	Number of Errors	Neutral	Minor	Major	Critical
Accuracy	29	3	16	5	5
Linguistic Conventions	23	10	9	4	0
Style	15	2	13	0	0
Terminology	34	4	29	1	0
Total	101	19	67	10	5

4.1.2.1 Critical Errors of Google Translate

Table 27: First Critical Accuracy Error of Google Translate

Seg.#	Source Text	Google Translate	Reference Translation
1	DEPREM ANINDA BİNA İÇERİSİNDEYSENİZ;	IF YOU ARE IN THE BUILDING DURING THE EARTHQUAKE;	IF YOU ARE IN A BUILDING DURING AN EARTHQUAKE:
2	Baş iki el arasına alınarak veya bir koruyucu (yastık, kitap vb) malzeme ile korunmalıdır.	The head should be protected by holding it between two hands or with a protective material (pillow, book, etc.).	Protect your head with your hands or with a cushion, book, or other protective material.
3	Sarsıntı geçene kadar bu pozisyonda beklenmelidir		Remain in this position until the earthquake stops.

To provide context, I included the segments prior to the error. The error occurs in the third segment. The source text provides guidance on what to do if the reader is inside a building. To minimize potential damage from falling debris, the source text instructs the reader to protect their head with their hands and any available material that can provide cover. In the third segment, the reader is instructed to maintain this position until the earthquake ends. However, this information was omitted in the MT output. Its omission is a critical error since the source text specifically advises against moving during an earthquake, making this piece of information crucial for the reader. Since it is an omission error, fixing it by pre-editing was not possible.

Table 28: Second Critical Accuracy Error of Google Translate

Seg.#	Source Text	Google Translate	Reference Translation
1	YANGIN SÖNDÜRME TÜPLERİNİN KULLANIMI;	USE OF FIRE EXTINGUISHING EXTINGUISHERS;	HOW TO USE A FIRE EXTINGUISHER:
2	Pimi çek,	Pull the pin,	Pull the pin,
3	Ateşin kaynağına yönelt,	Direct it to the source of the fire,	Aim at the base of the fire,
4	Sık,	Chic,	Squeeze the handle,
5	Süpür	sweep	Sweep

To provide context, I included the segments prior to and following the error. There are several errors in this excerpt, but the critical error occurs at the fourth segment. The source text provides guidance on how to use a fire extinguisher. Both DeepL and Google Translate struggled with certain parts of the source text, and this error serves as an example where both MT systems simultaneously failed. Google translated the word “sık” as “chic,” instead of “squeeze.” “Chic” means fashionable and elegant, which is irrelevant to the operation of a fire extinguisher. Google failed to distinguish the two Turkish words “sık” and “şık,” resulting in a critical failure to accurately convey a step in the instructions for using a fire extinguisher. As previously stated, failure to interpret a procedural step may result in improper use of the fire extinguisher, and potentially exacerbate the fire and endanger human lives. The other two errors in terminology and linguistic conventions categories are the translation of the term “yangın söndürme tüpleri” as “fire extinguishing extinguishers” in the first segment, and a capitalization error of the term “sweep” in the fifth segment, both of which are minor errors.

Table 29: Fixing the Second Critical Accuracy Error of Google Translate

Seg.#	Source Text	Google Translate
1	YANGIN SÖNDÜRME TÜPLERİ NASIL KULLANILIR:	HOW TO USE FIRE EXTINGUISHERS:
2	Pimi çek,	Pull the pin,

Table 29 - continue

3	Ateşin kaynağına yönelt,	Direct it to the source of the fire,
4	Tetiği sık,	Squeeze the trigger,
5	Süpür.	Sweep.

Making the source sentence more explicit by pre-editing the term as “tetiği sık,” which is the same pre-editing operation I used to correct the same error in DeepL, enabled Google to accurately translate the instruction, effectively resolving the error. The capitalization error in the fifth segment was fixable by simply inserting a period at the end of the word. Fixing the error in the first segment required rewriting it as “how to use fire extinguishers” instead of “the use of fire extinguishers.”

Table 30: Third Critical Accuracy Error of Google Translate

Source Text	Google Translate	Reference Translation
Sağlam eşyaların altında ve ya yanında hayat üçgeni oluşturarak ÇÖK-KAPAN-TUTUN hareketini uygulayın.	Create a life triangle under or next to solid objects and apply the CRASH-COVER-HOLD movement.	Form a triangle of life under or next to sturdy objects and perform the DROP, COVER, and HOLD ON action.

The source text provides guidance on what to do during a landslide if the reader is indoors. While the information on where to create a triangle of life is accurately conveyed, the most important action, “drop, cover and hold on” was mistranslated as “crash, cover, hold.” This is another instance where both MT systems failed to translate the Turkish terms “çök, kapan, tutun.” However, there is a slight difference between the two systems: DeepL translated it as “crump, capture, hold” while Google translated it as “crash, cover, hold.” It could be argued that the error of DeepL is more significant. Although Google mistranslated “drop” as “crash,” the two terms “kapan” and “tutun” were accurately translated as “cover” and “hold.” Google almost got the whole sentence right. Regardless, since every step in the action is important, mistranslation of a single step cannot be tolerated.

Table 31: Fixing the Third Critical Accuracy Error of Google Translate

Pre-edited Source Text	Google Translate
Sağlam eşyaların altında veya yanında hayat üçgeni oluşturun ve yere çökün, kapanın, ve tutunun.	Create a life triangle under or next to sturdy objects and kneel down, cover yourself, and hold on.

I applied the same pre-editing operation that I used to correct the same error in the output of DeepL. I replaced the verbal adverb “hayat üçgeni oluşturarak” (meaning “by forming a triangle of life”) with the imperative verb “hayat üçgeni oluşturun” (meaning “form a triangle of triangle”), then added “ve” (meaning “and”) to connect the following words. After that, I used a more polite form of imperative for the verbs by adding suffixes according to their major vowel harmony: “çökün, kapanın, ve tutunun.” This same pre-editing operation allowed both MT systems to accurately translate the segment, effectively resolving the error.

Table 32: Fourth Critical Accuracy Error of Google Translate

Source Text	Google Translate	Reference Translation
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa ÇÖK-KAPAN-TUTUN hareketi ile başınızı ve boynunuzu koruyun.	If you do not have time to escape from mud and debris flow or if there is no solid structure around you to hide behind, protect your head and neck with the CRASH-COVER-HOLD movement.	If you do not have enough time to escape from the mudflow and debris or if there are no sturdy objects to take cover behind, protect your head and neck by performing the DROP, COVER, and HOLD ON action

The source text provides guidance on what to do during a landslide. If the reader is outdoors and unable to escape in time or find a sturdy object or structure to take cover behind, the source text advises them to protect their head and neck by performing the “drop, cover, and hold on” action. Google accurately translated the conditional information in the first part of the sentence. However, the critical information on the description of the action to take was translated as “crash, cover, hold.” This is another example where both

DeepL and Google failed to translate the critical terms “çök, kapan, tutun.”

Table 33: Fixing the Fourth Critical Accuracy Error of Google Translate

Pre-edited Source Text	Google Translate
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa, başınızı ve boynunuzu korumak için yere çökün, kapanın, ve tutunun.	If you do not have time to escape from the mud and debris flow or there is no solid structure around you to hide behind, drop to the ground, cover yourself, and hold on to protect your head and neck.

I applied the same pre-editing operation that I used to correct the error in the output of DeepL. Reordering the source sentence to shift its meaning from “protect your head and neck with the drop, cover and hold on action” to “drop, cover, and hold on to protect your head and neck,” normalizing the spelling by using lowercase letters with commas between the words instead of hypens, and using a more polite imperative form of the verbs by adding suffixes according to their major vowel harmony rules enabled Google to accurately translate the instruction as “drop to the ground, cover yourself, and hold on,” effectively resolving the error.

Table 34: Fifth Critical Accuracy Error of Google Translate

Source Text	Google Translate	Reference Translation
Okulda sınıfta ya da büroda ise sağlam sıra, masa altlarında ve ya yanında; koridora ise duvarın yanına hayat üçgeni oluşturacak şekilde ÇÖK-KAPAN-TUTUN hareketi ile baş ve boyun korunmalıdır.	At school, in a classroom or in an office, under or next to a sturdy desk or table; If it is a corridor, the head and neck should be protected with the CRASH-COVER-HOLD movement, forming a life triangle next to the wall.	If you are in a school, classroom, or an office, form a triangle of life under a sturdy desk, table, or next to it, and protect your head and neck by performing the DROP, COVER and HOLD ON action; if you are in a corridor, form a triangle of life next to the wall and protect your head and neck by performing the DROP, COVER, and HOLD ON action.

The source text provides guidance on what to do if the reader is indoors, such as in a school or office environment. There are several errors in this excerpt. The first is the previously seen error pattern in the translation of the terms “çök, kapan, tutun.” Google translated the action using the words “crash, cover, hold” instead of the accurate ones “drop, cover, hold.” Both MT systems seem to struggle when translating these crucial terms. Once again, Google made a seemingly less significant error by translating the two terms as “cover” and “hold.” Still, the accurate translation for the “drop” action is missing, which alone renders the translation inappropriate. The other errors are major flaws in cohesion and coherence. As can be seen in the MT output, the information does not flow smoothly between phrases. Each sentence seems like a separate idea rather than part of a coherent whole. Additionally, the different scenarios (school, office, corridor) described in the source text are not linked in a meaningful way. The root cause of these errors seems to be the the word-to-word translation approach of the MT system.

Table 35: Fixing the Fifth Critical Accuracy Error of Google Translate

Seg.#	Pre-edited Source Text	Google Translate
1	Okulda, sınıfta ya da bürodaysanız sağlam sıra, masa altlarında veya yanında hayat üçgeni oluşturacak şekilde yere çök, kapan ve tutun hareketi ile başınızı ve boynunuzu koruyun; koridordaysanız duvarın yanına hayat üçgeni oluşturacak şekilde yere çök, kapan ve tutun hareketi ile başınızı ve boynunuzu koruyun	If you are at school, in a classroom or in an office, protect your head and neck with the kneeling, grabbing and holding movement to form a life triangle under or next to a solid desk, table; If you are in the corridor, protect your head and neck by kneeling down next to the wall to form a life triangle, grabbing and holding.
2	Okulda, sınıfta ya da bürodaysanız sağlam sıra veya masa altlarında veya yanında başınızı ve boynunuzu korumak için hayat üçgeni oluşturun ve yere çökün, kapanın ve tutunun. Koridordaysanız başınızı ve boynunuzu korumak için duvarın yanında hayat üçgeni oluşturun ve yere çökün, kapanın, ve tutunun.	If you are at school, in a classroom or in an office, form a life triangle under or next to a solid desk or table to protect your head and neck and kneel down, cover yourself and hold on. If you are in the hallway, form a life triangle near the wall and get down, cover yourself, and hold on to protect your head and neck.

The pre-editing operation I used to correct the same error of DeepL was only

partially effective. In the case of Google, the same pre-editing operation was even less effective, as can be seen in the first segment. The structure of the source sentence is the biggest obstacle in the way. The source text uses the participle “hayat üçgeni oluşturacak şekilde” (in a way that creates a triangle of life) and the adverbial phrase “çök, kapan, tutun hareketi ile” (with drop, cover, hold on action). The ordering of these units is the source of the problem. Therefore, as can be seen in the second segment, I pre-edited the source text by changing the passive voice to active, rephrased the participle “hayat üçgeni oluşturacak şekilde” (in a way that creates a triangle of life) to an imperative as “hayat üçgeni oluşturun” (form a triangle of life), restructured the source sentence to shift the emphasis from “çök, kapan, ve tutun hareketi ile başınızı ve boynunuzu koruyun” (protect your head and neck by performing the drop, cover, and hold on action) to “hayat üçgeni oluşturun ve yere çökün, kapanın ve tutunun” (form a triangle of life and drop, cover, and hold on), shifted the meaning of “başınızı ve boynunuzu koruyun” (protect your head and neck) to “başınızı ve boynunuzu korumak için” (to protect your head and neck) and positioned it before the main verb. In the end, the major cohesion error was resolved and Google was able to translate the terms “çök, kapan, tutun” as “get down, cover yourself, and hold on,” which is an acceptable translation for the action.

4.1.2.2 Major Errors of Google Translate

Table 36: Major Accuracy Errors of Google Translate

Seg.#	Source Text	Google Translate	Reference Translation
1	Araç meskun mahallerde ya da güvenli bir yerde değilse(ağaç ya da enerji hatları veya direklerinin yanında, köprü üstünde vb.); durdurulmalı, kontak anahtarı üzerinde bırakılarak terk edilmeli ve trafikten uzak açık alanlara gidilmelidir.	If the vehicle is not in residential areas or a safe place (next to trees or power lines or poles, on a bridge, etc.); should be stopped, left with the ignition key on, and driven to open areas away from traffic.	If the vehicle is in residential areas or not in a safe place (such as near trees, power lines, or poles, on a bridge, etc.), stop the vehicle, leave it with the key inside, and move to open areas away from traffic.
2	YIKINTI ALTINDA	IF YOU ARE TRAPPED	IF YOU ARE TRAPPED

Table 36 - continue

	MAHSUR KALDIYSANIZ;	UNDER DEMOLITION;	UNDER THE RUBBLE:
3	Eğer alevler çoğalmışsa ve binadan çıkış olanaksızsa, yatak altlarına dolaplara saklanılmamalı, pencereden dışarıdakilerle iletişim kurulmaya çalışılmalıdır,	If the flames have increased and it is impossible to exit the building, one should not hide in cupboards under the bed and try to communicate with people outside through the window.	If the fire has intensified and you are not able to leave the building, do not hide under beds or in wardrobes, but try to communicate with people outside through the window
4	Toprak kayması olabilecek, taş veya kaya düşebilecek yamaç altlarında bulunulmamalıdır.	It should not be located under slopes where landslides or stones or rocks may fall.	Avoid areas near slopes where landslides may occur or rock and boulder may fall.
5	Kırılmış ağaç ve kaya parçalarından korunmaya çalışılmalıdır.	Efforts should be made to protect it from broken trees and rocks.	Try to protect yourself from broken trees and rock fragments.

(Note that the segments are numbered for referencing; they do not appear consecutively as listed here.)

In the first segment, the source text provides instructions for readers who find themselves in a vehicle during an earthquake: turn off the vehicle's engine, exit the vehicle, and move towards open areas away from traffic. The first error is the mistranslation of information on the conditional statement regarding the location of the vehicle. MT output reads “if the vehicle is not in residential areas,” whereas the accurate translation should be “if the vehicle is in residential areas.” The problem is the ambiguous wording in the source sentence. There are two conditional clauses, one positive and one negative, but only one conditional suffix (-se) is present. As a result, since the conditional suffix is present in the negative sentence, Google interprets it as if it encompasses both conditions. This error can be easily fixed by inserting the -se suffix to the positive clause, as in “araç meskun mahallerde-yse.”

The other, more significant error in the first segment is the overtranslation of “move to open areas away from traffic” as “drive to open areas away from traffic.” The source text simply instructs the reader to abandon the vehicle and head to an open area away from buildings and traffic. Google, however, introduces significant confusion by instructing the

reader to “drive to open areas.” The error was not marked as critical but rather major, as it is understandable from the context that the vehicle should be abandoned. Fixing it was only possible by changing the word “gidin” (go) to “yürüyün” (walk). It can be said that when Google detects the word “car” in the input text, it automatically opts for “drive” verb when translating the verb “go,” regardless of whether the action should be performed by walking or driving.

In the second segment, Google overtranslated the term “yıkıntı” as “demolition” instead of the appropriate terms in an earthquake scenario, such as “rubble” or “debris.” The translation of Google significantly alters the intended meaning of the source text in an important part of the document, thus necessitating its classification as a major error. Pre-editing the source text by replacing the word “yıkıntı” with a synonym “enkaz” enabled Google to translate it as “if you are trapped under the wreckage.” “Wreckage” may not be the best equivalent for “enkaz” or “yıkıntı” in this context, but it is a closer term that conveys the intended meaning. Making Google use the correct terms “rubble” or “debris” was not possible through pre-editing.

In the third segment, the error is in the translation of two instructions: (1) not hiding in cupboards or under the beds, and (2) trying to communicate with people through the window. In the output of Google, the information appears ambiguous, as if the second instruction is not advised. Fixing it by pre-editing is possible by clarifying the message in the source text with the insertion of “fakat” (but) between the two instructions. This addition introduces a contradiction between the two actions, clarifying what should and should not be done.

In the fourth segment, the source text provides information about dangerous locations during an earthquake and advises against being in those locations. The error arises from the use of the passive voice in the source text. The Turkish word “bulunulmamalıdır” functions as a negative modal verb implying “one should not be located (in),” and this is where Google struggles. The MT output reads “it should not be located,” instead of the accurate translation “you should not be located,” which constitutes a major coherence error on its own. Pre-editing the source sentence by changing the passive voice to active, as in

“yamaç altlarında bulunmayın” enabled Google to translate the sentence as “do not be under slopes where landslides or stones or rocks may fall.” While “do not be” is not as idiomatic as “avoid,” it is a much better translation than “it should not be located,” conveying the intended idea with greater urgency.

In the fifth segment, the source text instructs the reader to seek protection against broken trees and rock fragments during an avalanche. Similar to the previous instance, the error is caused by the use of the passive voice in the source sentence. The MT output reads “protect it from broken trees and rocks.” Since the idea is to “protect yourself” from potential hazards, “protect it” lacks the meaning and emphasis present in the source sentence. Pre-editing the source text by changing the verb at the end of sentence from passive voice to active, as in “çalışın” (try to) instead of “çalışılmalıdır” (should be tried to), enabled Google to translate it as “try to protect yourself from broken trees and rocks,” effectively resolving the error.

Table 37: Major Linguistic Conventions Errors of Google Translate

Seg.#	Source Text	Google Translate	Reference Translation
1	Tavan ve duvara asılan avize, klima vb. cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağa ve kanca ile asılmalıdır.	Chandeliers, air conditioners, etc. hanging on the ceiling and wall. Devices should be hung with hooks, far enough away from walls and windows to support their weight.	Chandeliers, air conditioners, and similar items that can be hung on the ceiling and walls should be hung with hooks on a location that can support their weight, away from walls and windows.
2	Çünkü ayak bileğimize kadar olan sel suyu bizi; dizimize kadar olan sel suları ise otomobillerimizi sürükleyip götürebilir.	Because the flood water up to our ankles made us; Flood water up to our knees can wash away our cars.	Because ankle-deep floodwater can sweep you away and knee-deep floodwater can sweep cars away.
3	Konutların duvarlarında, katlardaki zeminlerde ve pencerelerdeki hasarlar, tavan, sıva vb. malzemelerin	Damages to the walls of residences, floors and windows, ceilings, plaster, etc. It should be checked	Check the damaged walls, floors, and windows in houses and the risk of falling materials such as

Table 37 - continue

	dökülmesi riskinin olup olmadığı kontrol edilmelidir.	whether there is a risk of spilling the materials.	ceilings and plaster.
4	Lağım çukurları, mikroplu tanklar ve atık su sistemleri sel sonrası insan sağlığına zarar vermemeleri için mutlaka yetkililere kontrol ettirilmelidir.	Septic tanks, septic tanks and wastewater systems must be checked by the authorities to ensure that they do not harm human health after floods.	Sewage pits, contaminated tanks, and wastewater systems must be inspected by authorities to ensure that they do not pose health risks after the flood.

In the first segment, it can be seen that Google split the sentence and it affects the overall understandability of the text. This error is caused by abbreviation “vb.” (meaning etc.). Pre-editing the source text by expanding the abbreviation to “ve benzeri” enabled Google to translate it as “Chandeliers, air conditioners and similar devices hung on the ceiling and walls should be hung with hooks and far enough away from the walls and windows to support their weight,” effectively resolving the cohesion error.

In the second segment, the source text informs the reader about the potential dangers of flood water, emphasizing that depending on the height of the flood water, it may sweep individuals or cars away. In the first part of Google’s translation, MT output reads: “because the floor water up to our ankles made us.” The issue is the mistranslation of the verb “götürebilir” as “made us” instead of the accurate translation “may wash us away.” This error is caused by the use of a semicolon between the two phrases in the source text. Pre-editing the source text by simply replacing the semicolon with a comma enabled Google to translate it as “because flood water up to our ankles can sweep us away, and flood water up to our knees can sweep away our cars,” effectively resolving the coherence error.

In the third segment, it can be seen that Google split the sentence. Similar to first segment, use of the abbreviation “vb.” (meaning etc.) resulted in a major cohesion error. Pre-editing the source text by expanding the abbreviation to “ve benzeri” enabled Google to translate the source sentence as “it should be checked whether there is any damage to the walls of the residences, floors and windows, and the risk of falling ceilings, plaster and similar materials,” effectively resolving the error.

In the fourth segment, the source text warns readers about potentially hazardous infrastructure following a flood. The three infrastructures are sewage pits, contaminated water tanks, and wastewater systems. However, in MT output, Google duplicated the term “septic tanks,” which refers to contaminated tanks, while omitting the mention of sewage pits. This omission constitutes a significant error, as the source text explicitly warns readers about the need for caution regarding sewage pits. Pre-editing the source text by changing the passive voice to active and appending accusative suffixes to the three terms as “çukurları-nı,” “tanklar-ı,” and “sistemleri-ni” did not provide an effective solution. Google’s translation included the terms “cesspit,” “germ tank,” which have different definitions from the terms used in the source text. Since this is a mixed terminology and duplication error, I was unable to fix this issue.

Table 38: Major Terminology Error of Google Translate

Source Text	Google Translate	Reference Translation
Çukur alanlarda, binaların bodrum katlarına su basma tehlikesi yüksek olduğundan, bu türlü yerlerde bodrum yapılmamalı, su basman kötü yüksek tutulmalıdır.	Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and the flood level should be kept high.	In low-lying areas, since there is a high risk of flooding in the basement floors of buildings, basements should not be constructed in such places, and the height of the plinth level should be kept high.

The error is the mistranslation of “su basman kötü” as “flood level” instead of the accurate term “plinth level.” As previously observed with the same error in DeepL, this term is an important term for flood prevention in low-lying areas. Since the “plinth level” is a highly specific term, completely fixing the error through pre-editing is not possible. However, as demonstrated in the DeepL example, substituting the term with “bina taban seviyesi,” a rough description that offers clarity, enabled Google to translate it as “building floor level should be kept high.”

4.1.2.3 Minor Errors of Google Translate

Table 39: Minor Accuracy Error of Google Translate (Example 1)

Source Text	Google Translate	Reference Translation
DEPREM SONRASINDA YAPILMASI GEREKENLER	THINGS TO DO AFTER AN EARTHQUAKE	WHAT TO DO AFTER AN EARTHQUAKE

The error is the undertranslation of “yapılması gerekenler” as “things to do” instead of accurate translations like “what to do” or “actions to be taken.” It is worth noting that Google consistently used the translation “things to do” whenever encountering this phrase. However, this translation lacks the importance and emphasis present in the source text. The phrase “things to do” appears more suited for informal contexts, such as a travel blog, where one might come across recommendations like “the 10 best things to do in Tokyo.” It is almost as if Google Translate took a vacation mid-text but forgot it was handling crucial earthquake aftermath advice. Fixing this error solely through pre-editing is challenging since the source sentence is a short and straightforward noun phrase, and its structure does not allow too much change. Fixing it through pre-editing is only possible by restructuring the sentence as an interrogative as “deprem sonrasında ne yapılmalı?”. When phrased as a question, Google is able to accurately translate it as “what to do after an earthquake?”, effectively resolving the error.

Table 40: Minor Accuracy Error of Google Translate (Example 2)

Source Text	Google Translate	Reference Translation
Bulunduğunuz yer güvenli ise; yolu kapatmadan sağa yanaşıp durulmalıdır.	If your location is safe; You should turn right and stop without blocking the road.	If you are in a safe location, pull over to the right without blocking the road and stop

The error is in the mistranslation of “sağa yanaşın” as “turn right” instead of the accurate translation “pull over to the right.” Since it is understandable from the context what is meant by “turn right,” the error was classified as minor. I removed the unnecessary semicolon and changed the passive voice to active. Then, I replaced “sağa yanaşın” with a synonymous phrase that explicitly mentions the vehicle, “aracı kenara çekin” (meaning

“pull the vehicle over”), which enabled Google to translate the sentence as “if it is safe where you are, pull over and stop without blocking the road.” When the input text does not include information about the presence of a vehicle, Google never uses the phrase “pull over.”

Table 41: Minor Linguistic Conventions Error of Google Translate (Example 1)

Source Text	Google Translate	DeepL Translator
Atık sistemlerinin kullanıldığı ve yerleşimin geliştiği tepelik alanlar	Hilly areas where waste systems are used and settlements develop	Hilly areas with dense settlement and where waste management systems are present

The translation of Google is mostly accurate but there is a minor word form error in the phrase at the end of the sentence: “and settlements develop.” As it stands, it suggests the idea that settlements are actively developing, rather than referring to areas with dense population or a high settlement. A better translation that conveys the idea in the source text could be “settlements have developed.” Pre-editing the source text by changing the tense of the phrase “yerleşimin geliştiği” from simple past to past perfect as “yerleşimin gelişmiş olduğu” enabled Google to translate the sentence as “hilly areas where waste systems are used and settlements are developed.”

Table 42: Minor Linguistic Conventions Error of Google Translate (Example 2)

Source Text	Google Translate	Reference Translation
Havayı kesme:	Cut off air:	Smothering:

The same source sentence was mistranslated as “do not cut the air” by DeepL, which was a critical error (see page 30). Google translated it as “cut off air.” In both instances, the issue arises from the use of the -me suffix in the source sentence. “Havayı kesme” functions as a subheading that introduces a specific method used in fire extinguishing. In the MT output, “cut off air” is an imperative sentence, which is a minor error in word form.

When the source text is pre-edited by using the -mek suffix instead of -me as in “havayı kesmek,” Google translates it as “cutting the air.” Whether this is an acceptable translation is debatable. Between “cutting off the air” and “cutting the air”, there is a subtle difference; the former sounds more suitable and more idiomatic for the context.

Table 43: Minor Style Error of Google Translate (Example 1)

Source Text	Google Translate	Reference Translation
Kontak anahtarı yerinde bırakılıp, pencereler kapalı olarak araç içerisinde beklenmelidir.	The ignition key should be left in place and the vehicle should be waited in with the windows closed.	Keep the key in ignition and wait inside the vehicle with the windows closed.

Overall, the translation of Google sounds awkward and unidiomatic. The issue arises from the passive voice used in the source text. Particularly, the translation of “araç içerisinde beklenmelidir” as “vehicle should be waited in” is the most significant error, making the translation extremely unidiomatic. Pre-editing the source text by simply changing the passive voice to active enabled Google to translate it perfectly as “leave the ignition key in place and wait in the vehicle with the windows closed.”

Table 44: Minor Style Error of Google Translate (Example 2)

Source Text	Google Translate	Reference Translation
Telaşa kapılmadan çevrede yangın ihbar düğmesi varsa ona basılmalıdır,	If there is a fire alarm button nearby, you should press it without getting alarmed.	Stay calm. If there is a fire alarm nearby, push the button.

In the MT output, the issue is the translation of the phrase “telaşa kapılmadan” as “without getting alarmed.” “Telaşa kapılma” could be translated into English as “do not be in a state of panic.” While the phrase “without getting alarmed” captures the essence of this Turkish phrase, it does not fully reflect the intended meaning of the source text. Besides, the presence of both “fire alarm button” and the instruction to press that button “without getting alarmed” in the translation results in an awkward style. To address this error

through pre-editing, it is necessary to substitute “telaşa kapılmayın” with a phrase close in meaning such as “sakin olun” (stay calm). Google consistently uses the phrase “without getting alarmed” for the translation of “telaşa kapılmayın,” thus necessitating an alternative lexical choice. When the source text is pre-edited and passive voice is changed to active, Google translates it as “stay calm, if there is a fire alarm button nearby, press it.”

Table 45: Minor Terminology Error of Google Translate (Example 1)

Source Text	Google Translate	Reference Translation
Su yatağı ve çukur bölgeler hemen terk edilmelidir.	Water beds and pit areas should be abandoned immediately.	Immediately evacuate stream beds and low-lying areas.

The issue is the mistranslation of “su yatağı” as “water beds” instead of the accurate term “stream beds.” As it stands, “water bed” refers to a type of mattress consisting of a plastic or rubber container filled with water, designed for sleeping. The literal meaning of “su yatağı” is “water bed,” and this overly literal translation approach results in an error under wrong term category. Fixing the error through pre-editing is possible by using the synonym “akarsu yatakları,” which enables Google to accurately translate it as “stream beds.”

Table 46: Minor Terminology Error of Google Translate (Example 2)

Source Text	Google Translate	Reference Translation
Çevrenizde yaralı veya yardıma muhtaç kişiler varsa, yangın ve yeni bir heyelan gibi bir tehlike yoksa onları yerlerinden oynatmayın.	If there are injured or needy people around you, do not move them unless there is a danger such as fire or a new landslide.	If there are injured or people in need of assistance nearby, do not move them unless there is a risk of another danger such as fire or another landslide.

The issue is the translation of “yardıma muhtaç kişi” as “needy people.” The English term “needy” is more commonly associated with poverty and describes an individual who requires assistance or support, often due to financial hardship. In this context, however, literal translation of “yardıma muhtaç kişi” is “a person in need of

assistance” within a natural disaster scenario. While “yardıma muhtaç kişi” can indeed be translated as “needy” in a different context, it does not align well with the present context. Pre-editing the source text by replacing the Turkish word “yardıma muhtaç” with a synonym “yardıma ihtiyacı olan” enabled Google to translate the phrase as “if there are people around you who are injured or need help,” effectively resolving the error.

4.2 Frequency and Distribution of Errors and Overall Quality Score

4.2.1 DeepL Translator

Out of 4432 words and 263 sentences, I identified a total of 89 errors. The absolute penalty total was 254.61, and the per-word penalty total was 0.06. The overall quality score was 94.26. With an average of 17.6 words per sentence, per-sentence penalty total was 1.05, and the rate of error occurrence was 0.34 per sentence.

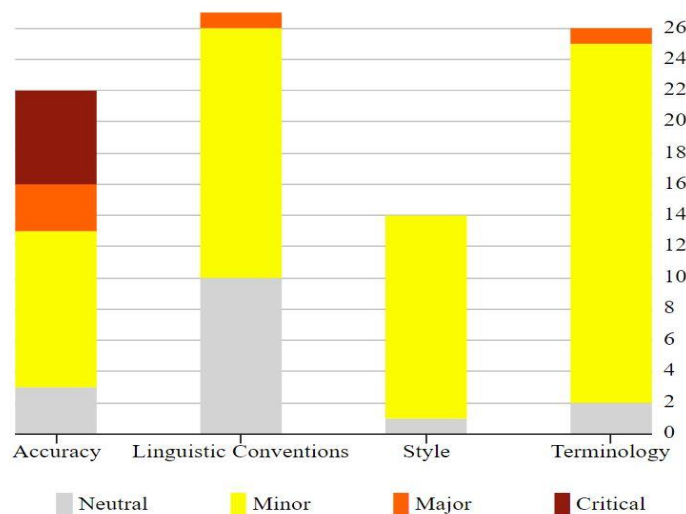


Figure 2: DeepL Translator Error Distribution and Frequency

The number of errors is not as high as I anticipated. Therefore, it is possible to presume that DeepL is capable of producing accurate and fluent translations, for the most part. However, the presence of not one but six critical errors, all falling under the most crucial category—accuracy—renders the MT output unfit for purpose.

Linguistic conventions accounted for the highest percentage of errors at 30.33 percent, followed closely by terminology errors at 29.21 percent. Accuracy errors

accounted for a significant portion at 24.71 percent, while style errors represented the category with least errors at 15.73 percent. The proportion of major and critical errors were 5.61 percent and 6.74 percent, respectively. The majority of errors, accounting for 69.66 percent, were categorized as minor. 17.97 percent of the errors were categorized as neutral.

4.2.2 Google Translate

Out of 4575 words and 270 sentences, I identified a total of 101 errors. The absolute penalty total was 258.75, and per-word penalty total was 0.06. The overall quality score was 94,34. With an average of 17.6 words per sentence, the per-sentence penalty total was 1.05, and the rate of error occurrence was 0.37 per sentence.

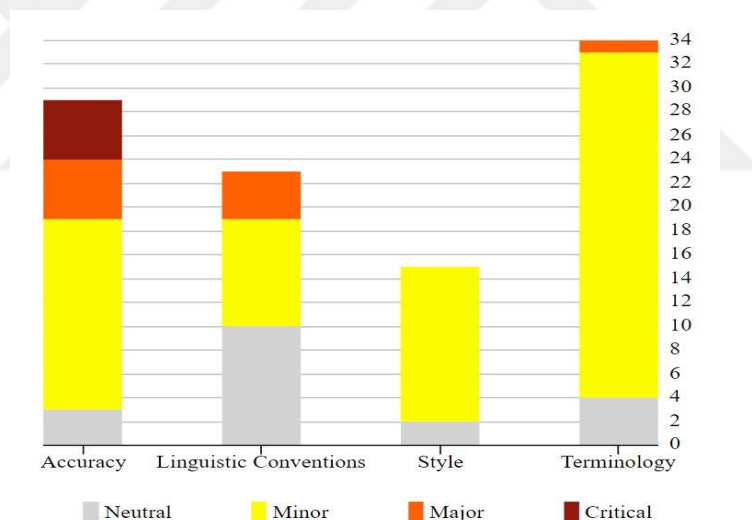


Figure 3: Google Translate Error Distribution and Frequency

Compared to DeepL, Google Translate had 5 more major errors, 1 less critical error, 5 more minor errors, and 3 more neutral errors. The five critical errors were in the accuracy category, which again renders the MT output unfit for purpose.

Terminology accounted for the highest percentage of errors at 33.66 percent, followed by accuracy errors at 28.71 percent. Linguistic conventions errors comprised 22.77 percent of the total, while style once again emerged as the category with the lowest

proportion of errors, standing at 14.85 percent. The majority of errors were categorized as minor, representing 66.33 percent of the total. Major and critical errors accounted for 9.90 percent and 4.95 percent, respectively. 18.81 percent of the errors fell into the neutral severity level.

4.3 Pre-editing Strategies and Their Impact on Errors

This section provides quantitative information about pre-editing strategies employed to address the errors. For a detailed table containing definitions and examples of pre-editing operations, please see Appendix K.

For both MT outputs, errors categorized as neutral were disregarded during the pre-editing process for two reasons. First, the neutral error category indicates a discrepancy between the annotator’s personal preference and the present translation, as judged subjectively by the error annotator. Since the neutral severity level already indicates translations deemed acceptable, there is no compelling reason to correct them. Second, as illustrated in the subsequent pre-editing typology tables, there is a specific value denoting the number of errors that cannot be fixed through pre-editing, labeled as “unable to fix.” Particularly concerning errors in the linguistic conventions category, it proved challenging to fix most neutral errors solely through pre-editing operations. Hence, to prevent neutral errors from artificially inflating the “unable to fix” value in the pre-editing typology table, they were excluded during pre-editing process. This approach aims to prevent any misleading interpretation of the quantitative data, with the broader emphasis placed on fixing minor, major, and critical errors.

4.3.1 DeepL Translator

Table 47: Typology of Pre-edit Operations for DeepL Translator. **A:** Accuracy, **LC:** Linguistic Conventions, **S:** Style, **T:** Terminology. The number in brackets after the initials indicates the total number of critical, major, and minor errors in each category.

Edit Operation	Frequency				Total
	A (19)	LC(17)	S (13)	T (24)	
Change of passive voice to active	7	7	6	0	20

Table 47 - continue

Sentence reordering	2	2	0	0	4
Spelling normalization	3	1	0	0	4
Semantic clarification	3	3	1	0	7
Use of alternative infinitive suffix	1	0	0	1	2
Conversion of verbal adverb to imperative	3	0	0	0	3
Use of alternative imperative form	1	0	0	0	1
Use/disuse of punctuation	2	1	0	0	3
Insertion of possessive suffix	2	2	2	0	6
Alternative lexical choice	4	2	6	4	16
Lexical simplification	1	2	0	1	4
Insertion of article	0	1	0	1	2
Pluralization of nominal noun	0	1	0	0	1
Disuse of “vb.” abbreviation	0	1	0	1	2
Total:	29	23	15	8	75
Unable to fix	2	2	1	17	22

Out of 73 critical, major, and minor errors identified in the MT output, 51 were successfully addressed through pre-editing. This suggests that pre-editing was effective in resolving a significant portion (69.86%) of the errors. The most frequent pre-edit operation was changing passive voice to active, with a total of 20 occurrences across all error categories. Other common pre-edit operations included alternative lexical choice (15 occurrences), and semantic clarification (8 occurrences). In 34 instances, a single pre-edit operation was sufficient to address the error, while in 12 instances, two pre-editing operations were required. Three instances necessitated 3 pre-editing operations. One instance required 4 distinct pre-editing operations, while in another, addressing the error required the application of 5 different pre-editing operations.

Fixing errors in the accuracy category required various pre-editing strategies, with the most prominent being changing passive voice to active. Four of the critical errors required more than one pre-editing operation, while two required a single pre-editing operation. Fixing 1 out of 3 major accuracy errors was possible through a single pre-editing

operation. The two major errors that could not be fixed through pre-editing were in the untranslated and mistranslation subcategories. It was possible to fix all minor accuracy errors. In seven instances, a single pre-editing operation was sufficient to fix the minor error, while 2 pre-editing operations were required in two instances, and 3 operations were necessary in one instance. In the accuracy category, a total of 29 pre-editing operations were applied to fix 17 errors.

Fixing errors in the linguistic conventions category also required different pre-editing strategies, with the most prominent being changing passive voice to active with seven occurrences. The major error was in textual conventions-cohesion category and fixing it required the application of 2 pre-editing operations. In ten instances, a single pre-editing operation was sufficient to fix the minor linguistic conventions error, while 2 pre-editing operations were required in three instances. In one instance, 5 different pre-editing operations were necessary to fix the minor error. It was possible to fix 14 out of 16 minor linguistic conventions errors through pre-editing. The 2 errors that could not be fixed through pre-editing were in the punctuation and grammar-word form subcategories. In the linguistic conventions category, a total of 23 pre-editing operations were applied to fix 15 errors.

Fixing errors in the style category mostly required the application of alternative lexical choice and changing passive voice to active pre-editing operations, each occurring 6 times. It was possible to fix 12 out of 13 minor style errors through pre-editing. The minor style error that could not be fixed was in the awkward subcategory. In this instance, the limiting factor was the structure and length of the source text, necessitating a rewrite in a substantially different manner—beyond the scope of pre-editing. In seven instances, a single pre-editing operation was sufficient to fix the minor style error, while 2 pre-editing operations were required in four instances. A total of 15 pre-editing operations were applied to fix 12 style errors.

Terminology emerged as the most challenging category when correcting errors through pre-editing. Out of 24 terminology errors, only 7 were fixable through pre-editing. Alternative lexical choice proved effective in four instances because in very few cases, an

alternative term was available for the mistranslated term. However, since alternatives were lacking in most cases, it was not possible to effectively fix the terminology errors through pre-editing.

4.3.2 Google Translate

Table 48: Typology of Pre-edit Operations for Google Translate. **A:** Accuracy, **LC:** Linguistic Conventions, **S:** Style, **T:** Terminology. The number in brackets after the initials indicates the total number of critical, major, and minor errors in each category.

Edit Operation	Frequency				Total
	A (26)	LC(13)	S (13)	T (30)	
Change of passive voice to active	7	2	4	0	13
Sentence reordering	2	0	0	0	2
Spelling normalization	2	0	0	2	4
Semantic clarification	8	1	1	0	10
Use of alternative infinitive suffix	0	1	0	0	1
Conversion of verbal adverb to imperative	2	0	0	0	2
Use of alternative imperative form	2	0	0	0	2
Use/disuse of punctuation	2	3	0	0	5
Insertion of possessive suffix	0	1	2	0	3
Alternative lexical choice	5	1	5	9	20
Lexical simplification	0	0	1	0	1
Insertion of article	0	2	0	0	2
Pluralization of nominal noun	0	0	0	0	0
Disuse of “vb.” abbreviation	0	2	0	0	2
Sentence restructuring	7	0	0	0	7
Total:	37	13	13	11	74
Unable to fix	2	1	1	19	23

Out of 82 critical, major, and minor errors identified in the MT output, 59 were successfully addressed through pre-editing. This suggests that pre-editing was effective in resolving a significant portion (71.95%) of the errors. The most frequent pre-edit operation

was alternative lexical choice with a total of 20 occurrences across all error categories, followed by change of passive voice to active (13 occurrences), and semantic clarification (10 occurrences). In forty-nine instances, a single pre-edit operation was sufficient to address the error, while in three instances, 2 pre-editing operations were required. Five instances required 3 pre-editing operations and one instance required 4 distinct pre-editing operations.

In the accuracy category, the most frequently used pre-editing operations were semantic clarification (8 occurrences), change of passive voice to active (7 occurrences), and sentence restructuring (7 occurrences). Pre-editing successfully resolved 4 out of 5 critical accuracy errors. The critical error that could not be fixed through pre-editing was in the omission subcategory. Although Google can translate the sentence when it is input alone, an omission occurs when the source text is provided as a whole document. One of the critical errors required a single pre-editing operation, two required 3 pre-editing operations, and one required 4 distinct pre-editing operations. All 5 major accuracy errors were fixable through pre-editing; four instances required a single pre-editing operation, while one instance required 3. 15 out of 16 minor accuracy errors were fixed through pre-editing. The single minor error that could not be fixed was in the overtranslation category. In thirteen instances, a single pre-editing operation was sufficient to fix minor errors, while two instances required 3 pre-editing operations. A total of 37 pre-editing operations were applied to fix 24 accuracy errors.

Addressing errors in the linguistic conventions category required the use of various pre-editing strategies, with no particular operation taking precedence. 3 out of 4 linguistic conventions errors were fixable through pre-editing. The major error that could not be fixed was in the duplication subcategory. A single pre-editing operation was sufficient to fix the 3 major errors. All minor errors were resolved through pre-editing, with eight instances requiring a single operation and one instance requiring 2 operations. A total of 13 pre-editing operations were applied to fix 12 linguistic conventions errors.

Alternative lexical choice and change of passive voice to active emerged as the most used pre-editing operations for fixing errors in the style category, with 5 and 4 occurrences,

respectively. 12 out of 13 style errors were fixed through pre-editing. The error that could not be fixed through pre-editing is the same error, belonging to awkward subcategory, as previously discussed in the earlier section. In nine instances, a single pre-editing operation was sufficient to fix the minor style error, while two instances required 2 different pre-editing operations. A total of 13 pre-editing operations were applied to fix 12 style errors.

Once again, terminology emerged as the most challenging category in terms of pre-editing effectiveness. Out of 30 errors, only 11 were fixable through pre-editing. As previously observed with DeepL, alternative lexical choice remained the primary pre-editing operation used to resolve terminology errors. In each instance, a single pre-editing operation was sufficient to resolve the terminology error.

5. CONCLUSION

This study aimed to conduct a comprehensive analysis of the performance of DeepL Translator and Google Translate in translating Turkish high-stakes texts into English, specifically guidelines for natural disasters. Additionally, it aimed to analyze the impact of pre-editing operations on fixing the errors in the MT outputs. Using the MQM framework, the raw outputs of both MT systems were evaluated. Segment-specific pre-editing operations were applied to source sentences where errors were detected in the MT outputs.

The analysis of translation errors revealed that both MT systems produced far fewer errors than expected; with DeepL having 0.34 errors per sentence and Google having 0.37 errors per sentence. However, there were still a significant number of major and critical errors. Among 101 errors, Google had 10 major and 5 critical errors, while DeepL had 5 major and 6 critical errors among 89 errors. This means that critical errors accounted for 4.95 percent and 6.94 percent of the total errors for Google and DeepL, respectively. This finding is important because it provides evidence on the unpredictable nature of MT and highlights the importance of human factor in translation tasks. While MT systems have made significant advancements, there remains a small yet real chance that they may produce critical errors. These errors have the potential to cause significant loss or change in meaning and affect the usability of the translation. As a translator, I strive to avoid comparing the professional translator to ever-evolving MT systems. However, upon consideration, it becomes apparent that while it is possible for both machines and humans to produce errors when translating, the errors produced by a human translator will not carry the same weight as those produced by a machine. A professional translator will likely produce minor errors that could even be considered “neutral” in the MQM terminology, whereas it is not quite possible to predict what type of errors current MT systems may produce, or how serious they may be.

Despite the occurrence of critical errors, the evaluation of pre-editing strategies revealed that most of the critical errors can be fixed through pre-editing. This means that in a scenario where a text is properly authored, or the possibility of using MT for translation is taken into consideration during authoring, the chances of MT to produce critical errors can

be reduced to a great extent. Yet, however small, there still remains a possibility for current MT systems to produce critical translation errors. Language and communication are delicate domains. It is true that in most cases, errors in translation might not always have catastrophic consequences. MT in such cases is a great, valuable, and essential tool, further enhancing the communication and removing language barriers. Nevertheless, in very limited cases, miscommunication that may arise from poor translations may lead to serious consequences. In those cases, human touch remains essential in ensuring that every detail is conveyed properly.

The analysis of pre-editing strategies revealed that pre-editing could address 69.86 percent of errors in DeepL's translation and 71.95 percent of errors in Google's translation. In most cases, a single pre-editing operation was sufficient to fix the error, but some errors required the application of more than one operation. The effort spent during pre-editing is not necessarily proportional to the severity level of an error. In some cases, addressing a minor error proved challenging, while in some instances, addressing a critical error was relatively easy. Fixing errors in the accuracy and linguistic conventions categories required various pre-editing strategies. Almost all errors in the style category benefited from alternative lexical choice and changing passive voice to active pre-editing operations. While the use of passive voice in instructive texts is not something uncommon in Turkish, in the target language norms, active voice is preferred over passive voice. This difference between the source and target language norms has been one of the primary reasons for unidiomatic style errors. Terminology errors were challenging to fix through pre-editing because they are often caused by specific terms or phrases that have precise matches in the MT system's lexicon. While accuracy, linguistic conventions, and style errors may have more flexible solutions, terminology errors have inherent limitations on the available solutions. In some cases, an alternative term for the mistranslated term could be found and was usually sufficient to correct the error, but such cases were limited. Thus, terminology errors served as a limiting factor, increasing the total number of errors that could not be fixed.

Another observation is that both Google and DeepL often corrected spelling,

punctuation errors, and typos in the source text themselves. In some instances, the source text contained such errors, yet they were translated by both MT systems as if the source text was free of errors. Additionally, neither MT system was able to properly comprehend references; for instance, when an object was referenced in subsequent segments, this reference was lost in translation.

It is important to mention some of the existing limitations in the study. Firstly, error annotation is inherently a highly subjective practice. One of the best examples of this is the difficulty in achieving a high inter-annotator agreement in error annotation studies where there are multiple error annotators. Given that I worked alone in this study, I kept this reality in my mind at all times, and I endeavored to remain as objective as possible and proceed without allowing room for subjective interpretations. Secondly, the results of this study were derived from the selected texts and their translation from Turkish to English by Google Translate and DeepL Translator. In different texts with different languages, different results may be obtained. Therefore, for future research, it is recommended to assess the performance of MT in translating high-stakes texts across various language pairs and using different MT engines, with the involvement of multiple error annotators.

To conclude, this study showed that raw MT output is not suitable for high-stakes contexts, and through pre-editing, most errors in the MT output can be eliminated. The capabilities of current widely available commercial MT systems are indeed impressive, but further refinement is necessary. It is very much possible that the long-awaited fully-automatic high-quality machine translation will be achieved in the not-too-distant future. For now, the human factor remains decisive in delivering appropriate translations.

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Appendix A – SOURCE TEXT

Çığa yakalanırsanız!

- Çığın büyüklüğüne, hızına, patika genişliğine, etraftaki araçlara veya doğal cisimlere bağlı olarak bulunulan alandan ayrılmaya karar verilmelidir.
- Çığın daha yavaş ve akış yüksekliği düşük olan patika kenarlarına doğru gidilmeye çalışılmalıdır.
- Diğer insanlar uyarılmalıdır. (ses, ısıklık, düdük, korna, vb.)
- Çığa yakalanmanız kesin ise, batonlar ve kayaklar çıkarılmalı ve herhangi bir cisme tutunmaya çalışılmalıdır.
- Kırılmış ağaç ve kaya parçalarından korunmaya çalışılmalıdır.
- Yerden destek alarak yüzme hareketi ile çığ yüzeyinde kalmaya çalışılmalıdır.
- Ağız sıkıca kapatılmalı, hava kesesi oluşturmaya çalışılmalıdır, bu arada baş sağa sola doğru çevrilmeye çalışılmalıdır.
- Akış esnasında oturma pozisyonu almaya çalışılarak (eller ve bacaklar bitişik) çığ durmadan önce bacaklar ile yer sertçe itilip (eğer zemin altta veya zemindeki kar setleşmeye başlamış ise) kalkılmaya çalışılmalıdır.
- Bayılacağınızı hissediyorsanız, buna direnmemelidir. Çünkü baygın bir insan daha az oksijen tüketir.
- Bazı olaylar sırt çantası taşıyan kişilerin çığ topuğu civarında, yüzeyde kalma şanslarının taşımayanlardan biraz daha fazla olduğunu göstermiştir.

Eğer araç içindeyseniz;

- Motoru durdurulup, ışıklar söndürülmelidir.
- Oksijeni iyi kullanmak için, sigara içilmemeli ve kibrit yakılmamalıdır.
- Telsiz var ise çağrı yapılmalı ve telsiz sürekli alıcı konumunda tutulmalıdır.
- Aracın kornası çalınarak dışarıya ses duyurulmaya çalışılmalıdır.
- Araçta çubuk benzeri bir alet var ise yukarı doğru batırılıp aramaya gelenlerin çubuğu ve dolayısı ile yerimizi görmeleri sağlanmalıdır.
- En son olarak ise, karı kazmak gerekir. Ancak, kendinizi kar içinde emniyette hissetmiyorsanız araçta kalmanız gerekir.

Deprem

DEPREM ÖNCESİ ALINACAK ÖNLEMLER

- Yerleşim bölgeleri titizlikle belirlenmelidir. Kaygan ve ovalık bölgeler iskana açılmamalıdır. Konutlar gevşek toprağa sahip meyilli arazilere yapılmamalıdır.

- Yapılar deprem etkilerine karşı dayanıklı inşa edilmelidir. (Yapı Tekniğine ve İnşaat Yönetmeliğine uygun olarak)
- İmar planında konuta ayrılmış yerler dışındaki yerlere ev ve bina yapılmamalıdır.
- Dik yarların yakınına, dik boğaz ve vadilerin içine bina yapılmamalıdır.
- Çok kar yağın ve çığ gelen yamaçlarda bina yapılmamalıdır.
- Mevcut binaların dayanıklılıkları arttırılmalıdır.
- Konutlara deprem sigortası yaptırılmalıdır.
- Bu önlemlerin yanı sıra, yapısal olamayan, yani binadan değıl de eşyalardan kaynaklanacak hasarlardan korunmak için günlük kullandığımız eşyalarımızın ev içersine yerleştirilmesinde aşğıda sayılan önlemleri almalıyız:
- Dolap üzerine konulan eşya ve büro malzemeleri kayarak düşmelerini önlemek için plastik tutucu malzeme veya yapıştırıcılarla sabitlenmelidir.
- Soba ve diğr ısıtıcılar sağlam malzemelerle duvara veya yere sabitlenmelidir.
- Dolaplar ve devrilebilecek benzeri eşyaları birbirine ve duvara sabitlenmelidir. Eğer sabitlenen eşya ve duvar arasında boşluk kalıyorsa, çarpma etkisini düşürmek için araya bir dolgu malzemesi konulmalıdır.
- Tavan ve duvara asılan avize, klima vb. cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağı ve kanca ile asılmalıdır.
- İçinde ağır eşyalar bulunan dolap kapakları mekanik kilitler takılarak sıkıca kapalı kalmaları sağlanmalı.
- Tezgah üzerindeki kayabilecek beyaz eşyalarımızın altına metal profil koyarak bunların kayması önlenmelidir.
- Zehirli, patlayıcı, yanıcı maddeler düşmeyecek bir konumda sabitlenmeli ve kırılmayacak bir şekilde depolanmalıdır. Bu maddelerin üzerlerine fosforlu, belirleyici etiketler konulmalıdır.
- Rafların önüne elastik bant ya da tel eklenebilir. Küçük nesneler ve şişeler, birbirlerine çarpmayacak ve devrilmeyecek şekilde, kutuların içine yerleştirilmelidir.
- Gaz kaçağı ve yangına karşı, gaz vanası ve elektrik sigortalarını otomatik hale getirilmelidir.
- Binadan acilen çıkmak için kullanılacak yollardaki tehlikeler ortadan kaldırılmalı, bu yollar işaretlemeli, çıkışı engelleyebilecek eşyalar çıkış yolu üzerinden kaldırılmalıdır.
- Geniş çıkış yolları oluşturulmalıdır. Dışa doğru açılan kapılar kullanılmalı, acil çıkış kapıları kilitli olmamalıdır. Acil çıkışlar aydınlatılmalıdır.
- Karyolalar pencerenin ve üzerine devrilebilecek ağır dolapların yanına konulmamalı, karyolanın üzerinde ağır eşya olan raf bulundurulmamalıdır.
- Tüm bireylerin katılımı ile (evde, iş yerinde, apartmanda, okulda) “Afete hazırlık planları” yapılmalı, her altı ayda bir bu plan gözden geçirilmelidir. Zaman zaman bu plana göre nasıl davranılması gerektiğinin tatbikatları yapılmalıdır.
- Bir afet ve acil durumda eve ulaşamayacak durumlar için aile bireyleri ile iletişimin nasıl sağlayacağı, alternatif buluşma yerleri ve bireylerin ulaşabileceğı bölge dışı bağlantı kişisi (ev, işyeri, okul içinde, dışında ve ya mahalle dışında) belirlenmelidir.

- Önemli evrakların (kimlik kartları, tapu, sigorta belgeleri, sağlık karnesi, diplomalar, pasaport, banka cüzdanı vb.) kopyaları hazırlanarak su geçirmeyecek bir şekilde saklanmalı, ayrıca bu evrakların bir örneği de bölge dışı bağlantı kişisinde bulunmalıdır.
- Bina yönetimince önceden belirlenen, mesken veya işyerinin özelliği ve büyüklüğüne göre uygun yangın söndürme cihazı mutlaka bulundurulmalı ve periyodik bakımları da yaptırılmalıdır. Bu cihazlar;
- Kolayca ulaşılabilir bir yerde tutulmalıdır.
- Yeri herkes tarafından bilinmelidir.
- Duvara sıkıca sabitlenmelidir.
- Her yıl ilgili firma tarafından bakımı yapılmalıdır.
- Bir kez kullanıldıktan sonra mutlaka tekrar doldurulmalıdır.
- Binalarda asansörlerin kapı yanlarına "Deprem Sırasında Kullanılmaz" levhası asılmalıdır.

DEPREM ANINDA YAPILMASI GEREKENLER

DEPREM ANINDA BİNA İÇERİSİNDEYSENİZ;

Kesinlikle panik yapılmamalıdır.

- Sabitlenmemiş dolap, raf, pencere vb. eşyalardan uzak durulmalıdır.

Varsa sağlam sandalyelerle desteklenmiş masa altına veya dolgun ve hacimli koltuk, kanepeler, içi dolu sandık gibi koruma sağlayabilecek eşya yanına çömelerek hayat üçgeni oluşturulmalıdır. Baş iki el arasına alınarak veya bir koruyucu (yastık, kitap vb) malzeme ile korunmalıdır. Sarsıntı geçene kadar bu pozisyonda beklenmelidir.

Güvenli bir yer bulup, diz üstü **ÇÖK**

Başını ve enseni koruyacak şekilde **KAPAN**

Düşmemek için sabit bir yere **TUTUN**

Merdivenlere ya da çıkışlara doğru koşulmamalıdır.

- Balkona çıkılmamalıdır.
- Balkonlardan ya da pencerelerden aşağıya atlanmamalıdır.
- Kesinlikle asansör kullanılmamalıdır.
- Telefonlar acil durum ve yangınları bildirmek dışında kullanılmamalıdır.
- Kibrit, çakmak yakılmamalı, elektrik düğmelerine dokunulmamalıdır.
- Tekerlekli sandalyede isek tekerlekler kilitlenerek baş ve boyun korumaya alınmalıdır.
- Mutfak, imalathane, laboratuvar gibi iş aletlerinin bulunduğu yerlerde; ocak, fırın ve bu gibi cihazlar kapatılmalı, dökülebilecek malzeme ve maddelerden uzaklaşılmalıdır.
- Sarsıntı geçtikten sonra elektrik, gaz ve su vanalarını kapatılmalı, soba ve ısıtıcılar söndürülmelidir.

- Diğer güvenlik önlemleri alınarak gerekli olan eşya ve malzemeler alınarak bina daha önce tespit edilen yoldan derhal terk edilip toplanma bölgesine gidilmelidir.
- Okulda sınıfta ya da büroda ise sağlam sıra, masa altlarında ve ya yanında; koridorsa ise duvarın yanına hayat üçgeni oluşturacak şekilde ÇÖK-KAPAN-TUTUN hareketi ile baş ve boyun korunmalıdır.
- Pencerelelerden ve camdan yapılmış eşyalardan uzak durulmalıdır.

DEPREM ANINDA AÇIK ALANDAYSANIZ;

- Enerji hatları ve direklerinden, ağaçlardan, diğer binalardan ve duvar diplerinden uzaklaşılmalıdır. Açık arazide çömelerek etraftan gelen tehlikelere karşı hazırlıklı olunmalıdır.
- Toprak kayması olabilecek, taş veya kaya düşebilecek yamaç altlarında bulunulmamalıdır. Böyle bir ortamda bulunuluyorsa seri şekilde güvenli bir ortama geçilmelidir.
- Binalardan düşebilecek baca, cam kırıkları ve sıvalara karşı tedbirli olunmalıdır.
- Toprak altındaki kanalizasyon, elektrik ve gaz hatlarından gelecek tehlikelere karşı dikkatli olunmalıdır.
- Deniz kıyısından uzaklaşılmalıdır.

DEPREM ANINDA ARAÇ KULLANIYORSANIZ;

- Sarsıntı sırasında karayolunda seyir halindeyseniz; Bulunduğunuz yer güvenli ise; yolu kapatmadan sağa yanaşıp durulmalıdır. Kontak anahtarı yerinde bırakılıp, pencereler kapalı olarak araç içerisinde beklenmelidir. Sarsıntı durduktan sonra açık alanlara gidilmelidir. Araç meskun mahallerde ya da güvenli bir yerde değilse(ağaç ya da enerji hatları veya direklerinin yanında, köprü üstünde vb.); durdurulmalı, kontak anahtarı üzerinde bırakılarak terk edilmeli ve trafikten uzak açık alanlara gidilmelidir.
- Sarsıntı sırasında bir tünelin içinde iseniz ve çıkışa yakın değilseniz; araç durdurulup aşağıya inilmeli ve yanına yan yatarak ayaklar karına çekilip, ellerle baş ve boyun korunmalıdır. (ÇÖK-KAPAN-TUTUN)
- Kapalı bir otoparkta iseniz; araç dışına çıkılıp, yanına yan yatarak, ellerle baş ve boyun korunmalıdır. Yukarıdan düşebilecek tavan, tünel gibi büyük kitleler aracı belki ezecek ama yok etmeyecektir. Araç içinde olduğunuz takdirde, üzerine düşen bir parça ile aracın içinde ezilebilirsiniz.

METRODA VEYA DİĞER TOPLU TAŞIMA ARAÇLARINDAYSANIZ:

- Gereksinim yoksa, kesinlikle metro ve trenden inilmemelidir. Elektriğe kapılabilir veya diğer hattın gelen başka bir metro yada tren size çarpabilir.

- Sarsıntı bitinceye kadar metro ya da trenin içinde, sıkıca tutturulmuş askı, korkuluk veya herhangi bir yere tutunmalı, metro veya tren personeli tarafından verilen talimatlara uyulmalıdır.

DEPREM SONRASINDA YAPILMASI GEREKENLER

KAPALI ALANDAYSANIZ;

- Önce kendi emniyetinizden emin olun.
- Sonra çevrenizde yardım edebileceğiniz kimse olup olmadığını kontrol edin.
- Depremlerden sonra çıkan yangınlar oldukça sık görülen ikincil afetlerdir. Bu nedenle eğer gaz kokusu alırsanız, gaz vanasını kapatın. Camları ve kapıları açın. Hemen binayı terk edin.
- Dökülen tehlikeli maddeleri temizleyin.
- Yerinden oynayan telefon ahizelerini telefonun üstüne koyun.
- Acil durum çantanızı yanınıza alın, mahalle buluşma noktanıza doğru harekete geçin.
- Radyo ve televizyon gibi kitle iletişim araçlarıyla size yapılacak uyarıları dinleyin.
- Cadde ve sokakların acil yardım araçları için boş bırakın.
- Her büyük depremde sonra mutlaka artçı depremler olur. Artçı depremler zaman içerisinde seyrekleşir ve büyüklükleri azalır. Artçı depremler hasarlı binalarda zarara yol açabilir. Bu nedenle sarsıntılar tamamen bitene kadar hasarlı binalara girilmemelidir. Artçı depremler sırasında da ana depremde yapılması gerekenler yapılmalıdır.

AÇIK ALANDAYSANIZ;

- Çevrenizdeki hasara dikkat ederek bunları not edin.
- Hasarlı binalardan ve enerji nakil hatlarından uzak durun.
- Önce hemen yakın çevrenizde acil yardıma gerek duyanlara yardım edin.
- Sonra mahalle toplanma noktanıza gidin.
- Yardım çalışmalarına katılın. Özel ilgiye ihtiyacı olan afetzedelere -yaşlılar, bebekler, özürllüer- yardımcı olun.

YIKINTI ALTINDA MAHSUR KALDIYSANIZ;

- Paniklemeden durumunuzu kontrol edin.
- Hareket kabiliyetiniz kısıtlanmışsa çıkış için hayatınızı riske atacak hareketlere kalkışmayın. Biliniz ki kurtarma ekipleri en kısa zamanda size ulaşmak için çaba gösterecektir.
- Enerjinizi en tasarruflu şekilde kullanmak için hareketlerinizi kontrol altında tutun.

- El ve ayaklarınızı kullanabiliyorsanız su, kalorifer, gaz tesisatlarına, zemine vurmak suretiyle varlığını duyurmaya çalışın.
- Sesinizi kullanabiliyorsanız kurtarma ekiplerinin seslerini duymaya ve onlara seslenmeye çalışınız. Ancak enerjinizi kontrollü kullanın.

Yangın

YANGINA KARŞI ALINMASI GEREKEN ÖNLEMLER

Kurum, kuruluş ve iş yerlerinde yangını önleyici tedbirler iki kısımda ele alınır;

Yapısal bakımdan yangından korunma:

- Yapılarda yanmaz veya yanması güç yapı malzemeleri kullanılmalıdır,
- Yangının yayılmasını önlemek amacıyla, yangın bölümleri oluşturulmalıdır,
- Dumanın yayılmasını önlemek için duvardan sızmaları önleyici tedbirler alınmalıdır,
- Yangının etkilerinden korunmuş kısa yangın çıkış yolları sağlanmalıdır,
- Ateşleyici ve yanıcı malzeme kaynakları birbirinden ayrı yerlerde depolanmalıdır,
- Her an çıkabilecek yangınlar için yangı söndürme cihazları çalışır durumda bulundurulmalıdır.

Organizasyon bakımından yangından korunma:

- Yangınlara karşı iyi bir bina yönetimi olmalıdır,
- Yangınlara karşı gerekli yasaklar konulmalıdır,
- Sabit elektrik tesisatı sık sık kontrolden geçirilmelidir,
- Sık sık yangın tatbikatları yapılmalıdır,
- Yangın çıkışları açık tutulmalı, acil ışıklandırma sistemleri kurulmalıdır,
- Gereksiz yangın yükü kaldırılmalıdır,
- Korunma sistemi ve tahliye planı kontrol edilmeli ve güncellenmelidir.
- Her türlü işyerinde yangın söndürme tüpü bulundurulmalı, düzenli bakımları yaptırılmalı ve nasıl kullanılacağı öğrenilmelidir.

Konutlarda yangını önleyici tedbirler

- Tavan arası ve bodrumlar temiz tutulmalıdır,
- Çocukların ateşle oynamasına izin verilmemelidir,
- Soba, kalorifer ve mutfak ocakları dikkatli kullanılmalıdır,
- Yanıcı maddeler konutun uygun yerinde saklanılmalıdır,
- Elektrik tesisatından çıkabilecek yangınlara karşı tesisatın düzenli bakımı yaptırılmalıdır,

- Sıvasız, çatlak, hatalı inşa edilmiş ve dolmuş bacalar kullanılmamalıdır,
- Konutlarda da yangın söndürme tüpü bulundurulmalı, düzenli bakımları yaptırılmalı ve nasıl kullanılacağı öğrenilmelidir.
- Konut Yangınlarında tahliye zamanı çok kısıtlıdır, bu nedenle konutlar için tahliye planı yapılmalıdır.
- Yangınlarda erken uyarı çok önemlidir, bu nedenle her konutta mümkünse bir kaç tane duman dedektörü bulundurulmalı, bunların düzenli olarak kontrolleri yapılmalıdır.

YANGIN SÖNDÜRMEDE KULLANILAN YÖNTEMLER

Soğutarak Söndürme:

- Su ile Soğutma: Yanıcı maddeyi boğma ve yanıcı maddeden ısı alarak yangının söndürülmesinde en büyük etken olmaktadır.
- Yanıcı Maddeyi Dağıtma: Yanan maddenin dağıtılmasıyla yangın nedeni olan yüksek ısı bölünür, bölünen ısı düşer ve yangı yavaş yavaş söner.
- Kuvvetli Üfleme: Yanan madde üzerinde kuvvetli olarak üflenene hava alevin sönmesine ve yanan maddenin ısısının düşmesine neden olmaktadır.

Soğutarak söndürme ilkesi ile başlangıç yangınlarında başarıya ulaşılabilir.

Havayı kesme:

- Örtme: Katı maddeler (kum, toprak, halı, kilim vb) ve kimyasal bileşikler (köpük, klor, azot vb) kullanılarak yanan maddenin oksijen ile temasının kesilmesi ile yapılan söndürmedir. Akaryakıt yangınlarına örtü oluşturan kimyasal kullanılmaktadır.
- Boğma: Yangının oksijenle temasının kesilmesi veya azaltılması amacıyla yapılan işlemdir. Özellikle kapalı yerlerde oluşan yangınlara uygulanır.
- Yanıcı Maddenin Ortadan Kaldırılması: Yanma koşullarından olan yanıcı maddenin ortadan kalkması sonucu yangının söndürülmesidir.

SÖNDÜRÜCÜ MADDELER NELERDİR?

- Su: Ateşi söndüren maddeler arasında en önemlisi sudur. Su özellikle A tipi yangınlar için (katı) mükemmel bir söndürücüdür.
- Kum: Yanıcı maddelerin oksijenle ilişkisinin kesilerek söndürülmesinde kullanılır.
- Karbondioksit Gazı (CO₂): Yanan maddenin üzerini kaplayan karbondioksit gazı yanıcı maddeyi oksijensiz bırakarak yangının söndürülmesi olayıdır.
- Kuru Kimyevi Tozlar: Kimyasal tozların cinslerine göre A,B,C sınıfı yangınlar etkin bir şekilde söndürülebilmektedir.

- Köpük: Köpük yanan yüzeyi tamamen kaplar. Bunun sonucu olarak da hava ile teması keser ve ayrıca soğutma özelliğinin bulunması nedeniyle de yangın söndürücü olarak kullanılır.

YANGIN SÖNDÜRME TÜPLERİ;

- Kolayca ulaşılabilir bir yerde tutulmalıdır.
- Yeri herkes tarafından bilinmelidir.
- Duvara sıkıca sabitlenmelidir.
- Her yıl ilgili firma tarafından bakımı yapılmalıdır.
- Bir kez kullanıldıktan sonra mutlaka tekrar doldurulmalıdır.

YANGIN SÖNDÜRME TÜPLERİNİN KULLANIMI;

- Pimi çek,
- Ateşin kaynağına yönelt,
- Sık,
- Süpür

YANGIN ANINDA YAPILMASI GEREKENLER

- Telaşa kapılmadan çevrede yangın ihbar düğmesi varsa ona basılmalıdır,
- 110 nolu telefondan yangın itfaiyeye bildirilmelidir. Yangının adresi en kısa ve doğru şekilde mümkünse yangının cinsi ile birlikte (bina, benzin, ahşap, araç vb) bildirilmelidir.
- İtfaiye gelinceye kadar mümkünse yangını söndürmek için eldeki mevcut imkanlardan yararlanılmalıdır.
- Yangın kapalı alandaysa yayılmasını önlemek için kapı ve pencereler kapatılmalıdır,
- Bunlar yapılırken kendimiz ve başkaları tehlikeye atılmamalıdır,
- Eğer alevler çoğalmışsa ve binadan çıkış olanaksızsa, yatak altlarına dolaplara saklanılmamalı, pencereden dışarıdakilerle iletişim kurulmaya çalışılmalıdır,
- Dumandan boğulmamak için yardım gelene kadar eğilerek ve sürünerek hareket edilmeli, ağız ve burun ıslak bez ya da mendille kapatılarak nefes alınmalıdır,
- Duman ve yanık kokusu başka odadan geliyorsa kapılar açılmamalı, kapıya dokunulmamalıdır.
- Kıyafetiniz alev almışsa; koşmadan durup yere yatarak yuvarlanılmalıdır. Battaniye türü örtüler alınarak alevler boğulmaya çalışılmalıdır.
- Eğer vücudumuzda yanık varsa, hemen soğuk suya tutulmalıdır.

ORMAN YANGINLARI

ORMAN YANGINLARININ NEDENLERİ

- İhmal ve dikkatsizlik nedeniyle çıkan orman yangınları:
- Ormanda güvenlik tedbiri alınmadan ateş yakılması,
- Yakılan ateşin söndürmeden bırakılması,
- Sönmemiş sigara izmariti ve kibritin yere atılması.
- Orman içinde veya bitişigindeki tarlalarda istenmeyen ot veya anızın yakılması,
- Gece aydınlatma için ormanda ateşle dolaşılması,
- Cam ve cam kırıklarının ormanda bırakılması,
- Çocukların orman içinde ateşle oynamaları.
- Kasıtlı çıkarılan orman yangınları:
- Tarla veya otlakları genişletmek için ormanın bilerek yakılması,
- Orman içinde yapılan kanunsuz işleri gizlemek için yangın çıkarılması,
- Birilerinden intikam almak veya bir şeyi sabote etmek için yangın çıkarılması,
- Yabani hayvanları uzaklaştırmak için yangın çıkarılması.

Kaynak: Devlet meteoroloji İşleri Genel Müdürlüğü

ORMAN YANGINLARININ ZARARLARI

- Biyolojik çeşitlilik büyük zarar görür.
- Ormanlarda yaşayan canlıların yaşam alanları yok olur.
- Canlı ve cansız örtünün yok olmasıyla erezyon, sel-taşkın ve hava Kirliliği gibi doğal afetlerin sayısında ve hızında artma görülür.
- İklim sisteminde (sıcaklık, rüzgâr, nem ve yağışa doğrudan etki ederek) bozulmalar görülür.
- Orman ve orman ürünlerine dayalı turizm, sağlık, spor, avcılık gibi sektörler olumsuz yönde etkilenir.

Sel

SELLERE KARŞI ALINMASI GEREKEN GENEL ÖNLEMLER NELERDİR?

- Her tip meteorolojik afet için, günümüzde yağış alanları ve yağış yoğunluklarının belirlenmesinde oldukça etkili bir biçimde kullanılan radar sistemleri ve uydu verileri ile çalışan erken uyarı birimleri teşkil edilmelidir.
- Bu uyarı birimi ile koordineli olarak çalışacak il ve ilçelerde kurtarma birimleri oluşturulmalıdır.
- Bölgesel radyolar herhangi bir tehlike anında halkı bilgilendirerek uygulayacakları yöntemler konusunda uyarıda bulunmalıdırlar.
- Yerel yönetimler dere yataklarına yerleşim yapılmaması konusunda titizlik göstermeli, buralarda yerleşimin önlemelidir.

- Yerleşim yerleri içinden geçen dere yatakları ve drenaj kanallarında, ayrıca dere ve nehirlerin denizle birleştiği noktalardaki kanallarda zamanla oluşabilecek tıkanmalara düzenli olarak temizlenmeli, sürekli açık olmaları sağlanmalıdır.
- Yerleşim yerleri içinden geçen dere yataklarına ıslah edilmelidir.
- Çevredeki yeşil alanlar korunarak ve artırılarak erezyon ve sel önlenmelidir.
- Sel tehlikesi bulunan eğimli yamaçlarda teraslama ve ağaçlandırma yapılmalıdır.
- Çukur alanlarda, binaların bodrum katlarına su basma tehlikesi yüksek olduğundan, bu türlü yerlerde bodrum yapılmamalı, su basman kotu yüksek tutulmalıdır.
- Şehir içlerinde yeterince yağmur suyu kanalı olmalı ve bunların sürekli bakımları yapılmalıdır.
- Bulduğumuz yerleşim yerlerinde sel uyarı işaretleri ve uyarı sistemleri öğrenilmelidir.
- Konutlar diğer afetlerde olduğu gibi sele karşı da sigortalatılmalıdır.

SEL SIRASINDA YAPILMASI GEREKENLER

- Pencere ve kapıları korumak için taşınabilir engeller yerleştirilebilir.
- Suyu sürüklenen enkazın yönünü kum torbalarıyla değiştirerek konutumuzdan uzak tutabiliriz.
- Bazı durumlarda bütün kapıları açarak suyun binanın içinden akmasına izin vermek çok daha iyidir; böylece su basıncının yapının taşıyıcı sistemine zarar vermesi önlenir.
- Su yatağı ve çukur bölgeler hemen terk edilmelidir.
- Sel bölgesini hemen terk ederek yüksek ve güvenli bölgelere gitmeli ancak asla sudan karşıdan karşıya geçmeye çalışılmamalıdır, çünkü su aniden derinleşebilir.
- Elektrik kaynaklarından uzak durulmalıdır, elektrik çarpabilir!...
- Özellikle geceleri, selin tehlikelerini görmek güçleşeceğinden daha dikkatli olunmalıdır.
- Selden ölümlerin çoğu sel sularına girilmesinden kaynaklanmaktadır. Çünkü ayak bileğimize kadar olan sel suyu bizi; dizimize kadar olan sel suları ise otomobillerimizi sürükleyip götürebilir. SELDEN KAÇMAK İÇİN SEL SULARINA KESİNLİKLE GİRMEYİNİZ!...
- Sel suları ayrıca kanalizasyon ve zehirli kimyasal maddeler de içerirler. Çocukların sel suları ile oynamasına müsaade edilmemelidir.
- Konutu terk ederken elektrik ve su vanaları kapatılmalıdır.
- Sel sırasında elektrikleriniz kesilebilir. Binada gaz sızıntısı olduğunu düşünüyorsanız, herhangi bir elektrikli alet ve ışık kullanmayın. Işığa ihtiyacınız olduğunda pilli fener kullanın.
- Evinizdeki küvet ve bidonları şebeke suyunun kirlenme ihtimaline karşı temiz su ile doldurunuz. SEL SIRASINDA ARAÇ İÇİNDEYSENİZ;
- Asla su ile kaplı yoldan gitmeye çalışılmamalıdır. Ani sellerin meydana getirdiği ölümlerin yarısı araç içindedir. -Asla sel sularının bulunduğu bölgelerde araç kullanmayınız.-

- Araçta herhangi bir arıza oluştuysa hemen terk edilerek yüksek bir yere çıkılmalıdır. Yollar akan sular tarafından doldurulacağı için eğer araç 60cm yükseklikteki hareket eden suda kalmışsa su onu kaldırıp sürükleyebilecektir.

SEL SONRASINDA YAPILMASI GEREKENLER

- Sel felaketi suların geri çekilmesi ile sona ermeyebilir. Dolayısı ile otoritelerin geri dönün uyarısı alınmadan ve herhangi bir hasarı olup olmadığı kontrol edilmeden binalara kesinlikle girilmemelidir.
- Binalar kontrol edilirken su geçirmez ayakkabı ve pille çalışan el fenerleri kullanılmalıdır.
- Konutların duvarlarında, katlardaki zeminlerde ve pencerelerdeki hasarlar, tavan, sıva vb. malzemelerin dökülmesi riskinin olup olmadığı kontrol edilmelidir.
- Sigorta işlemleri için zarar gören yerlerin fotoğrafı çekilmelidir.
- Sel sonrasında da ikincil afet olarak yangınlar çıkabilir. Bu nedenle evde gaz sızıntısı, suyun altında kalmış elektrik aksamı, fırın, ocak ve elektrikle çalışan eşyaların olmadığına emin olun.
- Sel sırasında evinizde kalmış yiyecekler varsa bunları kesinlikle kullanmayın. (Konservelerde dahil)
- Konuttaki sel suları binanın daha fazla zarar görmemesi için yavaş, yavaş boşaltılmalıdır.
- Lağım çukurları, mikrop lu tanklar ve atık su sistemleri sel sonrası insan sağlığına zarar vermemeleri için mutlaka yetkililere kontrol ettirilmelidir.
- Konuta sel sırasında yılan ve benzeri zararlı hayvanlar girebilir. Bu konuda da dikkatli olmak gerekir.
- Özel ilgiye ihtiyacı olan afetzedelere -yaşlılar, bebekler, özür lü ler- yardımcı olunmalıdır.

HEYELANLARDAN KORUNMA VE ZARARLARININ AZALTILMASI

HEYELANA KARŞI DUYARLI ALANLAR NERELERDİR?

- Eski heyelan bölgeleri
- Doğal yamaçların üst ve topuk kesimleri
- Eski dolguların üst ve topuk kesimleri
- Çok dik ve derin yamaçların üst ve topuk kesimleri
- Atık sistemlerinin kullanıldığı ve yerleşimin geliştiği tepelik alanlar

HEYELAN AÇISINDAN GÜVENLİ ALANLAR NERELERDİR?

- Geçmişte herhangi bir hareketin meydana gelmediği sert ve masif kayaların oluşturduğu yamaçlar
- Yamaç eğiminde ani değişimlerin gözlenmediği nispeten düşük eğimli araziler
- Burun şeklinde çıkıntılı sırtların üstü veya çevresi

HEYELAN TEHLİKESİNDEN KUŞKU DUYULDUĞUNDA NE YAPILMALI?

- Derhal yerel yönetimle temasa geçilmelidir.
- Heyelandan etkilenebilecek çevre bilgilendirilmelidir.
- Yapılar boşaltılmalıdır.

HEYELAN ANINDA YAPILMASI GEREKENLER

KAPALI ALANDAYSANIZ;

- Binadan çıkmak ve heyelan bölgesinden uzaklaşmak için yeterli vaktiniz yoksa içeride kalın
- Sağlam eşyaların altında ve ya yanında hayat üçgeni oluşturarak ÇÖK-KAPAN-TUTUN hareketini uygulayın.

AÇIK ALANDAYSANIZ;

- Tehlike anında heyelan veya çamur akıntısının yolundan uzak durarak hemen mümkün olduğu kadar yükseklerle doğru uzaklaşın ve çevrenizde yaşayan insanları toprak kaymasına karşı uyarın.
- Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa ÇÖK-KAPAN-TUTUN hareketi ile başınızı ve boynunuzu koruyun.

HEYELAN SONRASINDA YAPILMASI GEREKENLER

- Her şeyden önce güvencede olduğunuzdan emin olun. Gerekliyse tehlikeli bölgeden uzaklaşarak kendinizi güvenceye alın.
- Yakınıınızda bulunan elektrik, gaz ve su kaynaklarını hemen kapatın. Çevrenizde gaz kaçağı olmadığından emin olana kadar bulunduğunuz yeri kibrit veya diğer yanıcı maddeler ve ya elektrikli aletlerle aydınlatmaya çalışmayın. Fener kullanın.
- Çevrenizde yaralı veya yardıma muhtaç kişiler varsa, yangın ve yeni bir heyelan gibi bir tehlike yoksa onları yerlerinden oynatmayın.
- Tehlikeli duvarlar, çatılar ve bacalara karşı çevrenizdekileri uyarın ve bunların etrafında dolaşmayın.
- Radyo ve televizyon gibi kitle iletişim araçlarıyla size yapılacak uyarıları dinleyin.
- Cadde ve sokakların acil yardım araçları için boş bırakın.

- Eşya almak için zarar görmüş binalara girmeyin.

HEYELANLARIN ZARARLARININ EN AZA İNDİRİLMESİ KONUSUNDAKİ SORUMLULUKLAR

BİREYLERİN SORUMLULUKLARI

- Yaşanılan bölgedeki potansiyel jeolojik afetler hakkında bilgi sahibi olmak,
- Heyelan açısından sorunlu alanlarla ilgili olarak yerbilimcilere ve mühendislere danışmak,
- Dik yamaçların topuk kesiminde desteği kaldırıcı kazı işlemlerinden ve dik yamaçların kenarında veya tabanında yapı inşasından kaçınmak, ayrıca eğimi fazla yamaçların üzerine dolgu malzemesi dökmemek,
- Arazi satın alınmasından, arazi paylaşımından ve inşaat işlemlerinden önce ilgili kurum ve kuruluşlardan konuyla ilgili bilgi almak ve buna göre karar vermek.

YEREL YÖNETİMLER VE TEKNİK ELEMANLARIN SORUMLULUKLARI

- Yerleşim alanlarında yeteri kadar yerbilimleri ve mühendislik araştırmaları yapılmalıdır.
- Yerel yönetimler yeni yerleşim alanlarını belirlerken arazi çalışmaları ve değerlendirmeler yaptırarak, heyelana ve diğer afetlere maruz kalmış ve afetlerin beklenebilecek alanların belirlenmesiyle hazırlanacak duyarlılık haritaları yaptırmalı, bu haritalar aracılığıyla mühendislere, kent planlamacılarına yüksek riske sahip alanlardan kaçınılması konusunda veriler sunulmalıdır.

Appendix B – RAW OUTPUT OF DEEPL TRANSLATOR

Caught in an avalanche!

- Depending on the size of the avalanche, speed, width of the path, surrounding vehicles or natural objects, a decision should be made to leave the area.
- Attempts should be made to go towards the edges of the path where the avalanche is slower and the flow height is lower.
- Other people should be warned (voice, whistle, horn, etc.)
- If you are certain to be caught in an avalanche, remove poles and skis and try to hold on to any object.
- Try to avoid broken trees and rocks.
- Attempt to stay on the avalanche surface by swimming with support from the ground.
- Close the mouth tightly and try to create an air sac, while turning the head from side to side.
- During the flow, try to take a sitting position (hands and legs together) and try to get up before the avalanche stops by pushing the ground hard with the legs (if the ground is at the bottom or the snow on the ground has started to set).
- If you feel that you are going to faint, you should not resist it. Because a fainting person consumes less oxygen.
- Some incidents have shown that people carrying backpacks have a slightly better chance of staying on the surface around the avalanche heel than those not carrying them.

If you are in a vehicle;

- Stop the engine and turn off the lights.
- To use oxygen well, do not smoke and do not light matches.
- If there is a radio, a call should be made and the radio should be kept in the receiving position at all times.
- The horn of the vehicle should be blown to try to be heard outside.
- If there is a stick-like device in the vehicle, it should be immersed upwards so that the searchers can see the stick and therefore our location.
- Finally, it is necessary to dig out the snow. However, if you do not feel safe in the snow, you should stay in the vehicle.

Earthquake

PRECAUTIONS TO BE TAKEN BEFORE AN EARTHQUAKE

- Settlement areas should be determined meticulously. Slippery and lowland areas should not be opened for settlement. Houses should not be built on sloping land with loose soil.
- Buildings should be built resistant to earthquake effects (in accordance with Building Technique and Construction Regulations)
- Houses and buildings should not be built in places other than those allocated for housing in the zoning plan.
- Buildings should not be constructed near steep cliffs or in steep gorges and valleys.
- Buildings should not be constructed on slopes with heavy snowfall and avalanches.
- The durability of existing buildings should be increased.
- Houses should have earthquake insurance.
- In addition to these precautions, we should take the following precautions in placing our daily-used items inside the house to protect against non-structural damage, that is, damage caused by the items, not the building:
 - Furniture and office equipment placed on the cabinet should be fixed with plastic holding materials or adhesives to prevent them from slipping and falling.
 - Stoves and other heaters should be fixed to the wall or floor with sturdy materials.
 - Cabinets and similar items that may tip over should be fixed to each other and to the wall. If there is a gap between the fixed object and the wall, a padding material should be placed between them to reduce the impact.
 - Ceiling and wall hung chandeliers, air conditioners, etc. should be hung with hooks far enough away from the walls and windows to support their weight.
 - Cabinet doors with heavy items should be kept tightly closed by installing mechanical locks.
 - We should put a metal profile under the white goods on the countertop to prevent them from slipping.
 - Venomous, explosive and flammable substances must be secured in a position where they will not fall and stored in a way that will not break. Phosphorescent, identifying labels should be placed on these substances.
 - Elastic bands or wire can be added in front of the shelves. Small objects and bottles should be placed in boxes so that they do not bump into each other or tip over.
 - Against gas leakage and fire, gas valves and electrical fuses should be automated.

- Dangers on the roads to be used for emergency exit from the building should be eliminated, these roads should be marked, items that may prevent exit should be removed from the exit road.
- Wide exit routes should be created. Doors opening outwards should be used and emergency exit doors should not be locked. Emergency exits should be illuminated.
- Cots should not be placed near windows and heavy cabinets that may tip over, and there should be no shelves with heavy items on the bed.
- "Disaster preparedness plans" should be made with the participation of all individuals (at home, workplace, apartment, school) and this plan should be reviewed every six months. Drills on how to act according to this plan should be practiced from time to time.
- In the event of a disaster and emergency, how to ensure communication with family members, alternative meeting places and an out-of-area contact person (inside, outside the home, workplace, school, outside or outside the neighborhood) should be determined for situations where the home cannot be reached.
- Copies of important documents (identity cards, title deeds, insurance documents, health certificates, diplomas, passports, bankbooks, etc.) should be made and stored in a watertight place, and a copy of these documents should also be kept with the out-of-region contact person.
- A fire extinguisher suitable for the characteristics and size of the residence or workplace, determined in advance by the building management, must be available and periodic maintenance must be carried out. These devices
 - It should be kept in an easily accessible place.
 - Its place must be known by all.
 - It must be firmly fixed to the wall.
 - It must be maintained by the relevant company every year.
 - Once used, it must be refilled.
- "Not to be used during earthquake" signs should be hung on the door sides of elevators in buildings.

WHAT TO DO DURING AN EARTHQUAKE

IF YOU ARE INSIDE THE BUILDING DURING AN EARTHQUAKE;

There should be absolutely no panic.

- Unstabilized cabinets, shelves, windows, etc. should be avoided.

If available, a life triangle should be formed by crouching under a table supported by sturdy chairs or next to an item that can provide protection such as a full and bulky armchair, sofa, full chest. The head should be taken between both hands or protected with a protective

material (pillow, book, etc.). Wait in this position until the shaking subsides.

Find a safe place and get down on your knees

COVER to protect your head and neck

HOLD on to a stable place to avoid falling

Do not run towards stairs or exits.

- Do not go out on the balcony.
- Do not jump from balconies or windows.
- Absolutely no elevators should be used.
- Telephones should not be used except to report emergencies and fires.
- Matches, lighters should not be lit and electric switches should not be touched.
- If we are in a wheelchair, the wheels should be locked to protect the head and neck.
- In places where there are work tools such as kitchens, workshops, laboratories; stoves, ovens and such devices should be turned off, and materials and substances that may spill should be removed.
- After the tremor passes, electricity, gas and water valves should be turned off, stoves and heaters should be extinguished.
- Other safety precautions should be taken and the necessary belongings and materials should be taken and the building should be left immediately from the previously determined route and go to the assembly area.
- If in a classroom or office at school, the head and neck should be protected under or next to sturdy desks, desks or tables; if in a corridor, the head and neck should be protected by forming a life triangle next to the wall with the SQUAT-SLAM-HOLD-HOLD movement.
- Avoid windows and objects made of glass.

IF YOU ARE IN AN OPEN AREA DURING AN EARTHQUAKE;

- Move away from power lines and poles, trees, other buildings and wall bottoms. Be prepared for the dangers coming from around by crouching in open terrain.
- Do not go under slopes where landslides, stones or rocks may fall. If you are in such an environment, you should quickly move to a safe environment.
- Be cautious against chimneys, broken glass and plaster that may fall from buildings.
- Be careful of hazards from underground sewage, electricity and gas lines.
- Move away from the seashore.

IF YOU ARE DRIVING DURING AN EARTHQUAKE;

- If you are traveling on the highway during the tremor;
If your location is safe, pull over to the right without blocking the road and stop.

Leave the ignition key in place and wait inside the vehicle with the windows closed. After the shaking stops, go to open areas.

If the vehicle is not in a residential area or in a safe place (near trees or power lines or poles, on a bridge, etc.); it should be stopped, left with the ignition key on and abandoned and go to open areas away from traffic.

- If you are in a tunnel during a tremor and you are not close to the exit, the vehicle should be stopped, go down and lie on your side, feet on your stomach, and protect your head and neck with your hands. (CRASH-CAPTURE-HOLD)
- If you are in a closed parking lot, get out of the vehicle, lie on your side and protect your head and neck with your hands. Large masses such as ceilings and tunnels that may fall from above may crush the vehicle but will not destroy it. If you are inside the vehicle, you may be crushed inside the vehicle by a falling piece.

IF YOU ARE ON THE SUBWAY OR OTHER PUBLIC TRANSPORTATION:

- Never get off the subway or train unless absolutely necessary. You may be electrocuted or hit by another subway or train coming from the other line.
- Until the shaking is over, you should hold on to a tightly fastened hanger, railing or any other place inside the subway or train and follow the instructions given by the subway or train personnel.

WHAT TO DO AFTER AN EARTHQUAKE

IF YOU ARE IN A CLOSED AREA;

- Make sure of your own safety first.
- Then check if there is anyone around you who can help.
- Fires after earthquakes are very common secondary disasters. Therefore, if you smell gas, turn off the gas valve. Open windows and doors. Leave the building immediately.
- Clean up spilled hazardous substances.
- Put the displaced telephone handsets on top of the phone.
- Take your emergency kit with you and head to your neighborhood meeting point.
- Listen to warnings from mass media such as radio and television.
- Leave streets and alleys free for emergency vehicles.
- After every major earthquake, there are always aftershocks. Aftershocks become less frequent and decrease in magnitude over time. Aftershocks can cause damage to damaged buildings. For this reason, damaged buildings should not be entered until the tremors are completely over. During aftershocks, the same things should be done as during the main earthquake.

IF YOU ARE IN OPEN SPACE;

- Pay attention to the damage around you and take note of it.
- Stay away from damaged buildings and power transmission lines.
- First, help those in your immediate neighborhood who need emergency assistance.
- Then go to your neighborhood rally point.
- Participate in relief efforts. Help disaster victims who need special attention - the elderly, infants, disabled people.

IF YOU'RE TRAPPED UNDER THE RUBBLE;

- Check your situation without panicking.
- If your mobility is restricted, do not attempt to risk your life to get out. Know that rescue teams will try to reach you as soon as possible.
- Control your movements to make the most efficient use of your energy.
- If you can use your hands and feet, try to make your presence known by banging on water, heating, gas installations and the ground.
- If you can use your voice, try to hear the voices of rescuers and call out to them. But use your energy in moderation.

Fire**PRECAUTIONS AGAINST FIRE**

Fire prevention measures in institutions, organizations and workplaces are handled in two parts;

Structural fire protection:

- Non-combustible or hard-to-combust building materials should be used in buildings,
- Fire compartments should be established to prevent the spread of fire,
- To prevent the spread of smoke, measures should be taken to prevent leakage through the wall,
- Short fire exit routes protected from the effects of fire should be provided,
- Sources of ignition and combustible materials should be stored separately from each other,
- Fire extinguishers should be kept in working condition for fires that may break out at any time.

Fire protection in terms of organization:

- There should be good building management against fires,
- Necessary prohibitions against fires should be put in place,
- Fixed electrical installations should be checked frequently,
- Frequent fire drills should be conducted,
- Fire exits should be kept open and emergency lighting systems should be installed,
- Unnecessary fire load should be removed,
- The protection system and evacuation plan should be checked and updated.
- Fire extinguishers should be available in all workplaces, regularly maintained and learned how to use them.

Fire prevention measures in residential buildings

- The attic and basements must be kept clean,
- Children should not be allowed to play with fire,
- Stoves, radiators and kitchen stoves should be used with care,
- Flammable materials should be stored in an appropriate place in the dwelling,
- Regular maintenance of the installation should be carried out against fires that may arise from the electrical installation,
- Unplastered, cracked, improperly constructed and filled chimneys should not be used,
- Households should also be equipped with fire extinguishers, have them regularly maintained and learn how to use them.
- Evacuation time is very limited in residential fires, so an evacuation plan should be made for residences.
- Early warning is very important in fires, so every dwelling should have several smoke detectors, if possible, and these should be checked regularly.

METHODS USED IN FIRE EXTINGUISHING

Quenching by Cooling:

- Water Cooling: It is the biggest factor in extinguishing the fire by suffocating the combustible material and taking heat from the combustible material.
- Dispersing Combustible Material: By dispersing the burning material, the high heat that is the cause of the fire is divided, the divided heat decreases and the fire is gradually extinguished.
- Strong Blowing: The air blown strongly on the burning material causes the flame to go out and the temperature of the burning material to decrease.

The principle of extinguishing by cooling can be successful in initial fires.

Do not cut the air:

- **Covering:** It is extinguishing by cutting the contact of the burning substance with oxygen by using solid materials (sand, soil, carpet, rug etc.) and chemical compounds (foam, chlorine, nitrogen etc.). Chemicals are used to cover fuel fires.
- **Asphyxiation:** It is the process carried out in order to cut off or reduce the contact of the fire with oxygen. It is especially applied to fires occurring in closed places.
- **Elimination of Flammable Material:** It is the extinguishing of the fire as a result of the elimination of the combustible substance, which is one of the conditions of combustion.

WHAT ARE EXTINGUISHING AGENTS?

- **Water:** Water is the most important fire extinguishing agent. Water is an excellent extinguisher especially for type A (solid) fires.
- **Sand:** It is used to extinguish flammable materials by cutting their relationship with oxygen.
- **Carbon dioxide gas (CO₂):** Carbon dioxide gas covering the burning substance is the event of extinguishing the fire by leaving the combustible substance without oxygen.
- **Dry Chemical Powders:** Class A, B, C fires can be effectively extinguished according to the types of chemical powders.
- **Foam:** Foam completely covers the burning surface. As a result, it cuts off contact with air and is also used as a fire extinguisher due to its cooling properties.

FIRE EXTINGUISHERS;

- It should be kept in an easily accessible place.
- Its place must be known by all.
- It must be firmly fixed to the wall.
- It must be maintained by the relevant company every year.
- Once used, it must be refill.

USE OF FIRE EXTINGUISHERS;

- Pull the pin,
- Direct it to the source of the fire,
- Frequently,
- Sweep

WHAT TO DO IN CASE OF FIRE

- If there is a fire alarm button in the vicinity, it should be pressed without panic,

- 110 phone number should be used to report the fire to the fire brigade. The address of the fire should be reported in the shortest and most accurate way, if possible with the type of fire (building, gasoline, wood, vehicle, etc.).
- Until the fire brigade arrives, if possible, all available means should be used to extinguish the fire.
- If the fire is indoors, doors and windows should be closed to prevent it spreading,
- In doing so, we must not endanger ourselves or others,
- If the flames have spread and it is impossible to leave the building, do not hide under beds or in closets, but try to communicate with people outside through the window,
- In order not to suffocate from the smoke, you should move by bending and crawling until help arrives and breathe by covering your mouth and nose with a wet cloth or handkerchief,
- If the smell of smoke and burning comes from another room, doors should not be opened or touched.
- If your clothes are on fire, you should stop running and roll on the ground. Blankets should be taken and the flames should be smothered.
- If we have a burn on our body, we should immediately put it in cold water.

FOREST FIRES

CAUSES OF FOREST FIRES

- Forest fires caused by negligence and carelessness:
- Lighting a fire in the forest without taking safety precautions,
- Leaving a fire unextinguished,
- Throwing unextinguished cigarette butts and matches on the ground.
- Burning unwanted grass or stubble in fields within or adjacent to forests,
- Walking through the forest with a fire for illumination at night,
- Leaving glass and broken glass in the forest,
- Children playing with fire in the forest.
- Deliberately set forest fires:
- Intentional burning of forest to expand fields or pastures,
- Setting fires to hide illegal activities in the forest,
- Setting a fire to take revenge on someone or to sabotage something,
- Setting fires to drive away wild animals.

Source: General Directorate of State Meteorological Affairs

DAMAGES OF FOREST FIRES

- Biodiversity would suffer greatly.
- The habitats of the creatures living in forests are destroyed.

- With the disappearance of living and non-living cover, there is an increase in the number and speed of natural disasters such as erosion, floods and air pollution.
- There are disruptions in the climate system (with a direct impact on temperature, wind, humidity and precipitation).
- Sectors such as tourism, health, sports and hunting based on forest and forest products are negatively affected.

Sel

WHAT ARE THE GENERAL PRECAUTIONS AGAINST FLOODS?

- For all types of meteorological disasters, early warning units working with radar systems and satellite data, which are currently used very effectively in determining precipitation areas and precipitation intensities, should be organized.
- Rescue units should be established in provinces and districts to work in coordination with this warning unit.
- Regional radios should inform the public in case of danger and warn them about the methods they should follow.
- Local governments should be meticulous in preventing settlements in stream beds and settlements should be prevented in these areas.
- Stream beds and drainage channels passing through settlements, as well as channels at the points where streams and rivers meet the sea, should be cleaned regularly to prevent blockages that may occur over time, and they should be kept open at all times.
- Stream beds passing through settlements should be rehabilitated.
- Erosion and flooding should be prevented by protecting and increasing the surrounding green areas.
- Terracing and afforestation should be done on slopes with flood hazards.
- Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and the water level should be kept high.
- There should be enough rainwater channels in the inner cities and they should be constantly maintained.
- Flood warning signs and warning systems should be learned in the settlements we are in.
- Houses should be insured against floods as in other disasters.

WHAT TO DO DURING A FLOOD

- Portable barriers can be placed to protect windows and doors.
- We can divert waterborne debris away from our dwellings by using sandbags.

- In some cases it is much better to open all the doors and let the water flow through the building, so that the water pressure can be prevented from damaging the structural system of the building.
- Waterbeds and pit areas should be abandoned immediately.
- Leave the flood zone immediately and move to higher and safer ground, but never try to cross the water, as it can suddenly deepen.
- Stay away from electrical sources, you may get an electric shock!...
- Be extra careful, especially at night, when it is difficult to see the dangers of flooding.
- Most flood deaths are caused by entering flood waters. This is because floodwater up to our ankles can wash us away and floodwater up to our knees can wash away our cars. **NEVER ENTER FLOOD WATERS TO ESCAPE FROM FLOODS!....**
- Flood waters also contain sewage and toxic chemicals. Children should not be allowed to play in flood waters.
- Electricity and water valves should be turned off when leaving the house.
- Your electricity may be cut off during a flood. If you think there is a gas leak in the building, do not use any electrical appliances or lights. Use a battery-powered flashlight when you need light.
- Fill the bathtubs and canisters in your home with clean water in case the mains water is contaminated. **IF YOU ARE IN A VEHICLE DURING A FLOOD;**
- Never try to drive on a road covered with water. Half of the deaths caused by flash floods are in vehicles. -Never drive in areas where flood waters are present.
- If there is any malfunction in the vehicle, it should be abandoned immediately and taken to a high place. As the roads will be filled by flowing water, if the vehicle is stuck in moving water at a height of 60cm, the water will be able to lift and drag it.

WHAT TO DO AFTER A FLOOD

- Flooding may not end when the waters recede. Therefore, you should not enter buildings until you have been warned by the authorities to return and checked for any damage.
- Waterproof footwear and battery-operated flashlights should be used when checking buildings.
- The walls, floors, floors and windows of the houses should be checked for damages and the risk of spillage of materials such as ceilings, plaster, etc.
- For insurance purposes, the damaged areas must be photographed.
- Fires can also occur as a secondary disaster after a flood. Therefore, make sure that there are no gas leaks, submerged electrical components, ovens, stoves and electrically operated items in the house.
- If you have leftover food in your home during the flood, do not use it (including canned food).
- Flood waters in the dwelling should be drained slowly to prevent further damage to the building.

- Sewage pits, contaminated tanks and wastewater systems must be checked by the authorities after floods to ensure that they do not harm human health.
- Snakes and similar harmful animals may enter the house during floods. It is also necessary to be careful about this.
- Disaster victims in need of special attention - the elderly, infants, the disabled - should be assisted.

PROTECTION FROM LANDSLIDES AND MITIGATION OF THEIR DAMAGES

WHERE ARE LANDSLIDE-PRONE AREAS?

- Old landslide areas
- Top and heel cuts of natural slopes
- Top and heel cuts of old fillings
- Top and heel cuts of very steep and deep slopes
- Hilly areas where waste systems are used and settlements have developed

WHAT ARE THE SAFE AREAS FOR LANDSLIDES?

- Slopes formed by hard and massive rocks where no movement has occurred in the past
- Relatively low slope lands where sudden changes in slope are not observed
- Above or around ridges protruding in the shape of a nose

WHAT TO DO IF A LANDSLIDE IS SUSPECTED?

- Local authorities should be contacted immediately.
- The environment that may be affected by landslides should be informed.
- Buildings must be evacuated.

WHAT TO DO DURING A LANDSLIDE

IF YOU ARE IN A CLOSED AREA;

- If you don't have enough time to get out of the building and away from the landslide zone, stay inside
- Form a life triangle underneath or next to sturdy objects and practice the CRUMP-CAPTURE-HOLD.

IF YOU ARE IN OPEN SPACE;

- In case of danger, immediately move as far as possible to higher ground, staying out of the path of the landslide or mudflow, and warn the people around you about the landslide.
- If you do not have time to escape the flow of mud and debris, or if there is no sturdy structure to hide behind, protect your head and neck with the FALL-CAPTURE-HOLD.

WHAT TO DO AFTER A LANDSLIDE

- Above all, make sure you are safe. If necessary, secure yourself by moving away from the danger zone.
- Immediately turn off nearby electricity, gas and water supplies. Do not use matches or other flammable materials or electrical appliances to illuminate the area until you are sure there are no gas leaks. Use a flashlight.
- If there are injured or helpless people around you, do not move them unless there is a danger, such as a fire or a new landslide.
- Warn others about dangerous walls, roofs and chimneys and do not walk around them.
- Listen to warnings from mass media such as radio and television.
- Leave streets and alleys free for emergency vehicles.
- Do not enter damaged buildings to retrieve goods.

RESPONSIBILITIES FOR MINIMIZING THE DAMAGES OF LANDSLIDES

RESPONSIBILITIES OF INDIVIDUALS

- To have knowledge about potential geological disasters in the region,
- Consult with geoscientists and engineers on landslide-prone areas,
- Avoiding excavation operations that remove support at the heel of steep slopes and construction of structures at the edge or base of steep slopes, and not pouring filling material on slopes with high slopes,
- Obtaining relevant information from relevant institutions and organizations prior to land purchase, land sharing and construction and making decisions accordingly.

RESPONSIBILITIES OF LOCAL AUTHORITIES AND TECHNICAL STAFF

- Adequate geoscience and engineering surveys should be conducted in settlement areas.
- While determining new settlement areas, local governments should conduct field studies and assessments, and have susceptibility maps prepared by identifying areas that have been exposed to landslides and other disasters and where disasters can be

expected, and through these maps, engineers and urban planners should be provided with data on avoiding areas with high risk.



Appendix C – RAW OUTPUT OF GOOGLE TRANSLATE

If you get caught in an avalanche!

- The decision to leave the area should be made depending on the size of the avalanche, its speed, path width, surrounding vehicles or natural objects.
- One should try to move towards the edges of the path where the avalanche is slower and the flow height is lower.
- Other people should be warned. (voice, whistle, whistle, horn, etc.)
- If you are certain to be caught in an avalanche, poles and skis should be removed and you should try to hold on to any object.
- Efforts should be made to protect it from broken trees and rocks.
- One should try to stay on the avalanche surface by swimming with support from the ground.
- The mouth should be closed tightly, an attempt should be made to create an air sac, while the head should be turned left and right.
- During the flow, one should try to take a sitting position (hands and legs together) and try to get up by pushing the ground hard with the legs (if the ground below or the snow on the ground has started to harden) before the avalanche stops.
- If you feel like you are going to faint, you should not resist it. Because an unconscious person consumes less oxygen.
- Some events have shown that people carrying backpacks have a slightly better chance of staying on the surface near the avalanche toe than those without.

If you are in a vehicle;

- The engine should be stopped and the lights should be turned off.
- To use oxygen well, one should not smoke or light matches.
- If there is a radio, a call should be made and the radio should be kept in the receiver position at all times.
- An attempt should be made to make the sound heard outside by blowing the vehicle's horn.
- If there is a stick-like device in the vehicle, it should be dipped upwards so that those who come to search can see the stick and therefore our location.
- Finally, it is necessary to dig out the snow. However, if you do not feel safe in the snow, you should stay in the vehicle.

Earthquake

PRECAUTIONS TO BE TAKEN BEFORE THE EARTHQUAKE

- Settlement areas should be determined meticulously. Slippery and plain areas should not be opened to settlement. Housing should not be built on sloping lands with loose soil.
- Buildings should be built resistant to earthquake effects. (In accordance with Construction Techniques and Construction Regulations)
- Houses and buildings should be built in places other than those allocated for housing in the zoning plan.
- Buildings should not be built near steep cliffs, steep gorges and valleys.
- Buildings should not be built on slopes where it snows a lot and where avalanches occur.
- The durability of existing buildings should be increased.
- Earthquake insurance should be obtained for residences.
- In addition to these precautions, we should take the following precautions when placing our daily used items in the house in order to be protected from non-structural damage, that is, damage caused by items rather than the building:
 - Items and office supplies placed on the cabinet should be fixed with plastic holder materials or adhesives to prevent them from slipping and falling.
 - Stoves and other heaters should be fixed to the wall or floor with sturdy materials.
 - Cabinets and similar items that may tip over should be fixed to each other and to the wall. If there is a gap between the fixed item and the wall, a filling material should be placed in between to reduce the impact effect.
 - Chandeliers, air conditioners, etc. hanging on the ceiling and wall. Devices should be hung with hooks, far enough away from walls and windows to support their weight.
 - Cabinet doors containing heavy items should be kept tightly closed by installing mechanical locks.
 - White goods that may slide on the counter should be prevented from slipping by placing a metal profile under them.
 - Poisonous, explosive and flammable materials should be fixed in a position where they cannot fall and should be stored in a way that cannot be broken. Phosphorescent, identifying labels should be placed on these items.
 - Elastic band or wire can be added to the front of the shelves. Small objects and bottles should be placed inside the boxes so that they do not hit each other or topple over.
 - Gas valves and electrical fuses should be automated against gas leakage and fire.
 - Dangers on the routes to be used to exit the building urgently should be eliminated, these routes should be marked, and items that may obstruct the exit should be removed from the exit route.
 - Wide exit routes should be created. Doors that open outward should be used, and emergency exit doors should not be locked. Emergency exits should be illuminated.
 - Beds should not be placed next to windows or heavy cabinets that may topple over, and there should not be a shelf with heavy items on the bed.
 - "Disaster preparedness plans" should be made with the participation of all individuals (at home, at work, in an apartment, at school), and this plan should be

reviewed every six months. Exercises on how to act according to this plan should be carried out from time to time.

- In cases where home cannot be reached in case of a disaster or emergency, how to communicate with family members, alternative meeting places and an out-of-region contact person that individuals can reach (inside the home, workplace, school or outside the neighborhood) should be determined.
- Copies of important documents (identity cards, title deed, insurance documents, health certificate, diplomas, passport, bank book, etc.) should be prepared and kept in a waterproof manner, and a copy of these documents should be available to the out-of-region contact person.
- Appropriate fire extinguishing devices must be available and periodically maintained according to the characteristics and size of the residence or workplace, as determined by the building management. These devices;
 - It should be kept in an easily accessible place.
 - Its location should be known to everyone.
 - It must be fixed firmly to the wall.
 - It must be maintained by the relevant company every year.
 - Once used, it must be refilled.
 - A "Not Used During Earthquake" sign should be hung on the sides of the elevator doors in buildings.

THINGS TO DO DURING AN EARTHQUAKE

IF YOU ARE IN THE BUILDING DURING THE EARTHQUAKE;

You should definitely not panic.

- Unfixed cabinets, shelves, windows, etc. items should be avoided.

A life triangle should be created by squatting under a table supported by sturdy chairs, if available, or next to items that can provide protection, such as a plump and voluminous armchair, sofa, or a stuffed chest. The head should be protected by holding it between two hands or with a protective material (pillow, book, etc.).

Find a safe place and get on your knees.

CLOSE to protect your head and neck.

HOLD on to a stable place to avoid falling.

Do not run towards stairs or exits.

- You should not go out to the balcony.
- Do not jump off balconies or windows.
- Elevators should never be used.
- Telephones should not be used except to report emergencies and fires.
- Matches or lighters should not be lit and electrical switches should not be touched.

- If you are in a wheelchair, the wheels should be locked and your head and neck should be protected.
- In places where work equipment is located, such as kitchens, workshops and laboratories; Stoves, ovens and similar devices should be turned off and spilled materials and substances should be avoided.
- After the earthquake passes, electricity, gas and water valves should be closed and stoves and heaters should be turned off.
- Other security measures should be taken and the necessary items and materials should be taken, the building should be immediately left via the previously determined path and the assembly area should be reached.
- At school, in a classroom or in an office, under or next to a sturdy desk or table; If it is a corridor, the head and neck should be protected with the CRASH-COVER-HOLD movement, forming a life triangle next to the wall.
- You should stay away from windows and items made of glass.

IF YOU ARE IN AN OPEN AREA DURING THE EARTHQUAKE;

- You should stay away from power lines and poles, trees, other buildings and walls. One should be prepared for the dangers coming from the surroundings by squatting in the open field.
- It should not be located under slopes where landslides or stones or rocks may fall. If you are in such an environment, you should quickly move to a safe environment.
- Be careful against chimneys, broken glass and plaster that may fall from buildings.
- Care should be taken against the dangers arising from underground sewage, electricity and gas lines.
- You should stay away from the seashore.

IF YOU ARE DRIVING DURING AN EARTHQUAKE;

- If you are driving on the highway during an earthquake;
If your location is safe; You should turn right and stop without blocking the road. The ignition key should be left in place and the vehicle should be waited in with the windows closed. After the shaking stops, you should go to open areas. If the vehicle is not in residential areas or a safe place (next to trees or power lines or poles, on a bridge, etc.); should be stopped, left with the ignition key on, and driven to open areas away from traffic.
- If you are in a tunnel during an earthquake and are not close to the exit; The vehicle should be stopped, get down and lie on its side, feet drawn to the abdomen, and protect the head and neck with the hands. (DOWN-COVER-HOLD)
- If you are in a closed parking lot; You should get out of the vehicle and lie on your side, protecting your head and neck with your hands. Large masses such as ceilings

or tunnels that may fall from above may crush the vehicle, but will not destroy it. If you are in the vehicle, you may be crushed by a piece falling on you.

IF YOU ARE ON THE SUBWAY OR OTHER PUBLIC TRANSPORTATION:

- You should never get off the subway or train unless necessary. You may be electrocuted or you may be hit by another subway or train coming from the other line.
- You should hold on to a tightly attached hanger, railing or any other place inside the subway or train until the shaking ends, and follow the instructions given by the subway or train personnel.

THINGS TO DO AFTER AN EARTHQUAKE

IF YOU ARE IN A CLOSED AREA;

- Make sure of your own safety first.
- Then check if there is anyone around you that you can help.
- Fires that break out after earthquakes are quite common secondary disasters. Therefore, if you smell gas, turn off the gas valve. Open the windows and doors. Leave the building immediately.
- Clean up spilled hazardous materials.
- Place the mobile phone handsets on top of the phone.
- Take your emergency bag with you and head to your neighborhood meeting point.
- Listen to the warnings that will be given to you through mass media like radio and television.
- Leave streets and streets clear for emergency vehicles.
- After every major earthquake, there are always aftershocks. Aftershocks become less frequent and their magnitude decreases over time. Aftershocks may cause damage to damaged buildings. For this reason, damaged buildings should not be entered until the earthquakes are completely over. During aftershocks, the same things that should be done during the main earthquake should be done.

IF YOU ARE IN AN OPEN AREA;

- Note the damage around you.
- Stay away from damaged buildings and power lines.
- First, help those in your immediate surroundings who need urgent help.
- Then go to your neighborhood gathering point.
- Join relief efforts. Assist disaster victims who need special attention - the elderly, babies, the disabled.

IF YOU ARE TRAPPED UNDER DEMOLITION;

- Check your status without panicking.
- If your mobility is restricted, do not attempt any actions that would risk your life to get out. Know that rescue teams will try to reach you as soon as possible.
- Keep your movements under control to use your energy in the most economical way.
- If you can use your hands and feet, try to announce your presence by tapping on water, heating, gas installations and the ground.
- If you can use your voice, try to hear the voices of the rescue teams and call out to them. However, use your energy in a controlled manner.

Fire

PRECAUTIONS TO BE TAKEN AGAINST FIRE

Fire prevention measures in institutions, organizations and workplaces are discussed in two parts;

Structural fire protection:

- Fireproof or hard-to-burn building materials should be used in buildings,
- In order to prevent the spread of fire, fire sections should be created,
- To prevent the spread of smoke, measures should be taken to prevent leaks from the walls,
- Short fire exit routes protected from the effects of fire should be provided,
- Igniter and flammable material sources should be stored separately from each other,
- Fire extinguishers should be kept in working order in case of fires that may break out at any time.

Fire protection in terms of organization:

- There must be good building management against fires,
- Necessary prohibitions against fires should be put in place,
- Fixed electrical installations should be checked frequently,
- Fire drills should be held frequently,
- Fire exits should be kept open, emergency lighting systems should be installed,
- Unnecessary fire load should be removed,
- The protection system and evacuation plan should be checked and updated.
- A fire extinguisher should be kept in every workplace, regular maintenance should be done and how to use it should be learned.

Fire prevention measures in residences

- Attics and basements should be kept clean,
- Children should not be allowed to play with fire,
- Stoves, radiators and kitchen stoves should be used carefully.
- Flammable materials should be stored in a suitable place in the house,
- Regular maintenance of the installation should be carried out against fires that may arise from the electrical installation,
- Unplastered, cracked, incorrectly constructed and filled chimneys should not be used.
- Fire extinguishers should be kept in residences, they should be regularly maintained and they should be learned how to use them.
- Evacuation time for residential fires is very limited, so an evacuation plan must be made for residences.
- Early warning is very important in fires, therefore, if possible, several smoke detectors should be installed in each residence and they should be checked regularly.

METHODS USED IN FIRE FIGHTING

Extinguishing by Cooling:

- Cooling with Water: It is the biggest factor in extinguishing the fire by suffocating the flammable material and taking heat from the flammable material.
- Dispersing the Flammable Material: By dispersing the burning material, the high heat that causes the fire is divided, the divided heat decreases and the fire gradually goes out.
- Strong Blowing: Forceful air blowing on the burning material causes the flame to go out and the temperature of the burning substance to decrease.

Success can be achieved in initial fires with the principle of extinguishing by cooling.

Cut off air:

- Covering: It is extinguishing done by cutting off the contact of the burning substance with oxygen by using solid materials (sand, soil, carpet, rug, etc.) and chemical compounds (foam, chlorine, nitrogen, etc.). Chemicals are used to cover fuel fires.
- Smothering: It is the process performed to cut off or reduce the fire's contact with oxygen. It is especially applied to fires that occur in closed places.
- Elimination of Flammable Material: It is the extinguishing of the fire as a result of the elimination of the flammable material, which is one of the combustion conditions.

WHAT ARE EXTINGUISHING MATERIALS?

- Water: Among the substances that extinguish fire, water is the most important. Water is an excellent extinguisher, especially for type A fires (solid).
- Sand: It is used to extinguish flammable materials by cutting off their connection with oxygen.
- Carbon Dioxide Gas (CO₂): Carbon dioxide gas covering the burning material is the process of extinguishing the fire by leaving the flammable material deprived of oxygen.
- Dry Chemical Powders: Class A, B, C fires can be effectively extinguished depending on the type of chemical powders.
- Foam: Foam completely covers the burning surface. As a result, it cuts contact with air and is also used as a fire extinguisher due to its cooling feature.

FIRE EXTINGUISHING EXTINGUISHERS;

- It should be kept in an easily accessible place.
- Its location should be known to everyone.
- It must be fixed firmly to the wall.
- It must be maintained by the relevant company every year.
- Once used, it must be refilled.

USE OF FIRE EXTINGUISHING EXTINGUISHERS;

- Pull the pin,
- Direct it to the source of the fire,
- Chic,
- sweep

THINGS TO DO IN CASE OF FIRE

- If there is a fire alarm button nearby, you should press it without getting alarmed.
- The fire should be reported to the fire brigade by calling 110. The address of the fire should be reported as briefly and accurately as possible, along with the type of fire (building, gasoline, wood, vehicle, etc.).
- If possible, available means should be used to extinguish the fire until the fire brigade arrives.
- If the fire is in a closed area, doors and windows should be closed to prevent its spread.
- While doing these, ourselves and others should not be endangered.
- If the flames have increased and it is impossible to exit the building, one should not hide in cupboards under the bed and try to communicate with people outside through the window.

- In order not to suffocate from the smoke, bend and crawl until help arrives, cover your mouth and nose with a wet cloth or tissue, and breathe.
- If the smoke and burning smell is coming from another room, the doors should not be opened or touched.
- If your clothing caught fire; Before running, you should stop and lie down on the ground and roll. Blanket-type covers should be taken and attempts should be made to smother the flames.
- If there is a burn on our body, it should be immediately put into cold water.

FOREST FIRES

REASONS OF FOREST FIRES

- Forest fires caused by negligence and carelessness:
- Lighting a fire in the forest without taking safety precautions,
- Leaving a lit fire without extinguishing it,
- Throwing an unlit cigarette butt and a match on the ground.
- Burning unwanted grass or stubble in the forest or adjacent fields,
- Walking around the forest with fire for illumination at night,
- Leaving glass and glass shards in the forest,
- Children playing with fire in the forest.
- Deliberately started forest fires:
- Intentional burning of forest to expand fields or pastures,
- Setting fires to hide illegal activities in the forest,
- Starting a fire to take revenge on someone or to sabotage something,
- Setting fires to drive away wild animals.

Source: General Directorate of State Meteorological Affairs

DAMAGES OF FOREST FIRES

- Biodiversity is greatly damaged.
- The habitats of creatures living in forests are destroyed.
- With the destruction of living and non-living cover, there is an increase in the number and speed of natural disasters such as erosion, floods and air pollution.
- Disturbances occur in the climate system (directly affecting temperature, wind, humidity and precipitation).
- Sectors such as tourism, health, sports and hunting based on forests and forest products are negatively affected.

Flood

WHAT ARE THE GENERAL PRECAUTIONS TO BE TAKEN AGAINST

FLOODS?

- For all types of meteorological disasters, early warning units should be established working with radar systems and satellite data, which are used very effectively today in determining rainfall areas and rainfall intensities.
- Rescue units should be established in provinces and districts to work in coordination with this warning unit.
- Regional radios should inform the public in case of any danger and warn them about the methods they will apply.
- Local governments should be careful not to settle in stream beds and prevent settlement there.
- The stream beds and drainage channels passing through the settlements, as well as the channels at the points where the streams and rivers meet the sea, should be cleaned regularly to prevent blockages that may occur over time, and they should be kept open at all times.
- The stream beds passing through the settlements should be improved.
- Erosion and floods should be prevented by protecting and increasing the surrounding green areas.
- Terracing and afforestation should be done on sloping slopes that are at risk of flooding.
- Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and the flood level should be kept high.
- There should be enough rainwater channels in the cities and their constant maintenance should be done.
- Flood warning signs and warning systems should be learned in our settlements.
- Houses should be insured against floods as well as other disasters.

THINGS TO DO DURING A FLOOD

- Portable barriers can be placed to protect windows and doors.
- We can keep the debris carried away by water away from our home by changing its direction with sandbags.
- In some cases it is much better to open all the doors and let the water flow through the building; Thus, water pressure can be prevented from damaging the structural system of the structure.
- Water beds and pit areas should be abandoned immediately.
- You should leave the flood zone immediately and go to high and safe areas, but never try to cross the water because the water may suddenly deepen.
- You should stay away from electrical sources, you may get an electric shock!...
- You should be more careful, especially at night, as it will be difficult to see the dangers of the flood.

- Most deaths from floods are caused by entering flood waters. Because the flood water up to our ankles made us; Flood water up to our knees can wash away our cars. **NEVER ENTER THE FLOOD WATER TO ESCAPE THE FLOOD!...**
- Floodwater also contains sewage and toxic chemicals. Children should not be allowed to play with flood waters.
- Electricity and water valves should be turned off when leaving the house.
- Your electricity may be cut off during a flood. If you think there is a gas leak in the building, do not use any electrical appliances or lights. Use a battery-powered flashlight when you need light.
- Fill the bathtubs and canisters in your home with clean water in case the mains water is contaminated. **IF YOU ARE IN A VEHICLE DURING A FLOOD;**
- One should never attempt to drive on a road covered with water. Half of the deaths caused by flash floods are in vehicles. -Never drive in areas with floodwater.-
- If there is any malfunction in the vehicle, it should be abandoned immediately and moved to a higher place. Since the roads will be filled by flowing water, if the vehicle is stuck in moving water at a height of 60cm, the water will be able to lift it and drag it.

THINGS TO DO AFTER A FLOOD

- The flood disaster may not end with the waters receding. Therefore, buildings should never be entered without receiving a warning from the authorities to return and checking whether there is any damage.
- Waterproof shoes and battery-powered flashlights should be used when checking buildings.
- Damages to the walls of residences, floors and windows, ceilings, plaster, etc. It should be checked whether there is a risk of spilling the materials.
- For insurance purposes, photographs of the damaged areas must be taken.
- Fires may also occur as secondary disasters after floods. For this reason, make sure that there are no gas leaks, electrical parts submerged under water, ovens, stoves and electrical items at home.
- If there is any food left in your home during the flood, do not use it. (Including canned goods)
- Flood waters in the house should be drained slowly to prevent further damage to the building.
- Septic tanks, septic tanks and wastewater systems must be checked by the authorities to ensure that they do not harm human health after floods.
- Snakes and similar harmful animals may enter the house during floods. It is necessary to be careful about this, too.
- Disaster victims who need special attention - the elderly, babies, the disabled - should be helped.

PROTECTION FROM LANDSLIDES AND REDUCING THEIR DAMAGES

WHERE ARE THE AREAS SENSITIVE TO LANDSLIDES?

- Old landslide areas
- Upper and toe sections of natural slopes
- Upper and heel cuts of old fillings
- Upper and toe sections of very steep and deep slopes
- Hilly areas where waste systems are used and settlements develop

WHERE ARE THE SAFE AREAS IN TERMS OF LANDSLIDES?

- Slopes formed by hard and massive rocks where no movement has occurred in the past
- Lands with relatively low slopes where sudden changes in slope are not observed
- Above or around the nose-shaped protruding ridges

WHAT SHOULD BE DONE WHEN IN DOUBT OF LANDSLIDE DANGER?

- Local government should be contacted immediately.
- The environment that may be affected by the landslide should be informed.
- Structures must be evacuated.

THINGS TO DO IN THE EVENT OF A LANDSLIDE

IF YOU ARE IN A CLOSED AREA;

- If you do not have enough time to leave the building and move away from the landslide area, stay inside
- Form a triangle of life under or next to solid objects and apply the CRASH-COVER-HOLD movement.

IF YOU ARE IN AN OPEN AREA;

- In case of danger, stay away from the path of the landslide or mudflow, move as high as possible and warn the people living around you about the landslide.
- If you do not have time to escape from mud and debris flow or if there is no solid structure around you to hide behind, protect your head and neck with the CRASH-COVER-HOLD movement.

THINGS TO DO AFTER LANDSLIDE

- First of all, make sure you are safe. If necessary, secure yourself by moving away from the danger area.
- Immediately turn off electricity, gas and water supplies near you. Do not try to illuminate your area with matches or other flammable materials or electrical appliances until you are sure that there is no gas leak around you. Use a flashlight.
- If there are injured or needy people around you, do not move them unless there is a danger such as fire or a new landslide.
- Warn those around you about dangerous walls, roofs and chimneys and do not walk around them.
- Listen to the warnings that will be given to you through mass media such as radio and television.
- Leave streets and streets clear for emergency vehicles.
- Do not enter damaged buildings to retrieve items.

RESPONSIBILITIES FOR MINIMIZING THE DAMAGES OF LANDSLIDES

RESPONSIBILITIES OF INDIVIDUALS

- To have information about potential geological disasters in the region,
- Consult with geoscientists and engineers regarding landslide problem areas,
- Avoiding excavation operations that remove support at the toe of steep slopes and building structures on the edges or at the base of steep slopes, and not pouring filling material on steep slopes,
- To obtain information on the subject from relevant institutions and organizations before land purchase, land sharing and construction operations and to make decisions accordingly.

RESPONSIBILITIES OF LOCAL GOVERNMENTS AND TECHNICAL STAFF

- Adequate earth science and engineering research should be carried out in residential areas.
- While determining new settlement areas, local governments should conduct field studies and evaluations, and prepare sensitivity maps by determining areas that have been exposed to landslides and other disasters and where disasters can be expected, and through these maps, data should be provided to engineers and urban planners on avoiding high-risk areas.

Appendix D – REFERENCE TRANSLATION

If you get caught in an avalanche:

- Decide to leave the area depending on the size and speed of the avalanche, width of the path, and the vehicles or natural objects around.
- Try to move towards the edges of the trail where the avalanche is slower and the flow height is lower.
- Warn other people. (using any sound, whistle, horn, etc.)
- If you are certain to be caught in the avalanche, remove your poles and skis and try to hold on to any object.
- Try to protect yourself from broken trees and rock fragments.
- Taking support from the ground, try to stay on the surface of the avalanche by performing a swimming motion.
- Close your mouth tightly and at the same time, try turning your head from side to side to create an air pocket.
- During the flow, try to take a sitting position with your hands and legs close together and before the avalanche stops, try to stand up by firmly pushing the ground (if the ground is below or the snow on the ground has started to harden) with your legs.
- If you feel like you are going to faint, you should not resist it. Because a faint person consumes less oxygen.
- Some incidents have shown that people carrying backpacks have a slightly higher chance of staying on the surface near the avalanche toe than those who do not.

If you are in a vehicle:

- Stop the engine and turn off the lights.
- To use oxygen efficiently, do not smoke and do not light matches.
- If you have a two-way radio, make a call and keep it in the receiver mode at all times.
- Try to make yourself heard outside by honking the horn of the vehicle.
- If there is a tool such as a stick in the vehicle, dip it upwards so that the searchers can see the stick and therefore your location.
- Finally, you need to dig in the snow. However, if you do not feel safe in the snow, you should stay in the vehicle.

Earthquake

PRECAUTIONS TO BE TAKEN BEFORE AN EARTHQUAKE

- Residential areas should be determined carefully. Slippery and lowland areas should not be opened for settlement. Houses should not be built on terrain with slopes and loose soil.
- Structures should be built resistant to earthquake effects (in accordance with Building Techniques and Construction Regulation).
- Houses and buildings should not be constructed in areas other than those designated for residential purposes in the zoning plan.
- Buildings should not be constructed near steep cliffs, in steep gorges, and within valleys.
- Buildings should not be constructed on slopes where heavy snowfall and avalanches occur.
- Existing building structures should be strengthened.
- Houses should be insured against earthquakes.
- In addition to these measures, take the following precautions when placing your everyday items inside the house to protect against non-structural damage, which may arise from household items rather than the building itself:
 - To prevent items and office supplies placed on top of cupboards from sliding and falling, secure them with plastic holders or adhesives.
 - Secure stoves and other heaters to the wall or floor with sturdy materials.
 - Secure wardrobes and similar items that may tip over to each other and to the wall. If there is a gap between the secured item and the wall, use filler material between them to prevent them from hitting each other.
 - Chandeliers, air conditioners, and similar items that can be hung on the ceiling and walls should be hung with hooks on a location that can support their weight, away from walls and windows.
 - Secure heavy items in wardrobes by installing mechanical locks to ensure they remain tightly closed.
 - Prevent white goods that can slide by placing metal profiles underneath them.
 - Secure toxic, explosive, and flammable substances in a place where they will not fall and store them in a way that they will not break. Place phosphorescent identification labels on these items.
 - You may put elastic bands or run wires in front of the shelves. Place small objects and bottles inside boxes in a way that they will not collide or tip over.
 - Have automatic gas valves and circuit breakers to prevent gas leaks and fires.
 - The hazards on the routes that will be used when urgently leaving the building should be removed, these routes should be marked, and items that may obstruct the exit route should be removed.
 - Create wide exit routes. Use doors that open outward and do not keep emergency exit doors locked. Illuminate emergency exits.
 - Do not place beds next to windows and heavy wardrobes that may tip over and do not place shelves with heavy items above the beds.
 - Prepare disaster preparedness plans at home, at work, at the apartment, and at the school with the participation of all individuals and review these plans every six months. Conduct occasional drills on how to act according to this plan.

- Determine how communication will be established with family members in a disaster and emergency situation where the home cannot be reached, identify alternative meeting places and designate contact persons inside and outside the home, workplace, school, or neighborhood that individuals can reach.
- Prepare copies of important documents such as identification cards, title deeds, insurance documents, health records, diplomas, passports, bank wallets, etc. and store them in a waterproof manner, also, ensure that a copy of these documents is kept with the contact person.
- Make sure to have a fire extinguisher suitable for the features and size of the building or workplace, determined in advance by the building management, and ensure its regular maintenance. Keep these extinguishers:
 - Within accessible reach.
 - In a place known to everyone.
 - Firmly secured to the wall.
 - Yearly maintained by the relevant company
 - Refilled after each use.
 - Put "not to be used during an earthquake" signs on the doors of elevators in buildings.

WHAT TO DO DURING AN EARTHQUAKE

IF YOU ARE IN A BUILDING DURING AN EARTHQUAKE:

Never panic.

- Stay away from unsecured wardrobes, shelves, windows and similar items.

If available, crouch under a sturdy table or next to an item that can provide protection, such as a well-padded and bulky chair, sofa, or a filled trunk, creating a triangle of life. Protect your head with your hands or with a cushion, book, or other protective material. Remain in this position until the earthquake stops.

Find a safe place and **DROP** down to the floor

COVER to protect your head and neck

HOLD ON to a sturdy object to prevent falling

Do not run towards stairs or exits.

- Do not go out onto the balcony.
- Do not jump down from balconies or windows.
- Never use elevators.
- Refrain from using phones except to report emergencies and fires.
- Do not light matches and lighters and do not touch electrical switches.
- If you are in a wheelchair, lock the wheels and protect your head and neck.

- If you are in an area such as a kitchen, workshop or laboratory where there are appliances, turn off stoves, ovens, and similar appliances and avoid substances that may spill.
- After the earthquake stops, turn off electricity, gas, and water valves, stoves and heaters.
- Take other safety precautions, gather necessary items and materials, then immediately evacuate the building using the predetermined route to reach the assembly area.
- If you are in a school, classroom, or an office, form a triangle of life under a sturdy desk, table, or next to it, and protect your head and neck by performing the DROP, COVER, and HOLD ON action; if you are in a corridor, form a triangle of life next to the wall and protect your head and neck by performing the DROP, COVER, and HOLD ON action.
- Stay away from windows and objects made of glass.

IF YOU ARE OUTDOORS DURING AN EARTHQUAKE:

- Stay away from power lines and poles, trees, other buildings, and walls. Crouch down in open areas and beware of hazards from the surroundings.
- Avoid areas near slopes where landslides may occur or rock and boulder may fall. If you are in such an area, immediately move to a safe place.
- Be cautious of chimneys, broken glass, and plaster that may fall from buildings.
- Beware of hazards from underground sewage, electricity and gas lines.
- Move away from the seashore.

IF YOU ARE DRIVING A VEHICLE DURING AN EARTHQUAKE:

- If you are driving on the highway during an earthquake:
If you are in a safe location, pull over to the right without blocking the road and stop. Keep the key in ignition and wait inside the vehicle with the windows closed. After the earthquake stops, move to open areas.
If the vehicle is in residential areas or not in a safe place (such as near trees, power lines, or poles, on a bridge, etc.), stop the vehicle, leave it with the key inside, and move to open areas away from traffic.
- If you are inside a tunnel during an earthquake and are not close to the exit, stop the vehicle and get out, lie down next to the vehicle, pull your knees to your chest, and protect your head and neck with your hands (DROP, COVER, and HOLD ON).
- If you are in an enclosed parking lot, exit the vehicle, lie down next to the vehicle, and protect your head and neck with your hands. Large masses such as the ceiling that may fall from above may crush the vehicle but will not destroy it completely. If you stay inside the vehicle, you could be crushed by a falling object.

IF YOU ARE ON THE SUBWAY OR OTHER PUBLIC TRANSPORTATION:

- Unless absolutely necessary, do not get off the subway or train. You could be electrocuted or run over by a train or subway from another line.
- Hold onto firmly secured straps, handrails, or any other handle inside the train or subway until the earthquake stops and follow instructions given by the train or subway staff.

WHAT TO DO AFTER AN EARTHQUAKE

IF YOU ARE INDOORS:

- First, ensure your own safety.
- Then, check if there is anyone around you who you can help.
- Fires often occur as secondary disasters after earthquakes. Therefore, if you smell gas, turn off the gas valve. Open windows and doors. Leave the building immediately.
- Clean up any spilled hazardous materials.
- Fix the displaced telephone receivers.
- Take your emergency kit with you and head to your neighborhood assembly area.
- Listen to warnings through mass communication tools such as radio and television.
- Keep streets and roads empty for emergency vehicles.
- There are always aftershocks after every major earthquake. Aftershocks decrease in frequency and magnitude over time. Aftershocks may cause further damage to already weakened buildings. Therefore, do not enter damaged buildings until the aftershocks are completely over. During aftershocks, continue to follow the same safety procedures as during the main earthquake.

IF YOU ARE OUTDOORS:

- Pay attention to the damage around you and take notes.
- Avoid damaged buildings and power lines.
- Assist those in immediate need of help in your vicinity.
- Then, head to your neighborhood assembly area.
- Participate in relief efforts. Help disaster victims who require special attention such as the elderly, infants, the disabled.

IF YOU ARE TRAPPED UNDER THE RUBBLE:

- Stay calm and assess your condition.
- If your movement is restricted, refrain from risky actions that could jeopardize your safety. Remember that rescue teams will make every effort to reach you as soon as possible.
- Keep your movements under control to conserve your energy.

- If you can use your hands and feet, try to make yourself heard by tapping on pipes, walls, or the floor.
- If you can use your voice, try to hear the voices of rescue teams and call out to them. However, use your energy cautiously.

Fire

PRECAUTIONS TO TAKE AGAINST FIRE

There are two aspects to preventive measures against fire in institutions, organizations, and workplaces:

Structural fire protection measures include:

- The use of non-combustible or fire-resistant building materials in buildings,
- Building fire compartmentations to prevent the spread of fire,
- Taking measures to prevent the spread of smoke leaking through the wall,
- Establishing short fire exit routes protected from the effects of fire,
- Storing flammable and combustible materials separately,
- Having fire extinguishing devices in working condition at all times for potential fire incidents.

Organizational fire protection measures include:

- Implementation of effective building management for fire prevention,
- Establishment of necessary regulations for fire prevention,
- Regular inspection of electrical installations,
- Conducting frequent fire drills,
- Keeping emergency fire exits clear and installing emergency lighting systems,
- Removing unnecessary fire load,
- Regular inspection and updating of fire protection systems and evacuation plans.
- Fire extinguishers should be available in all workplaces, undergo regular maintenance, and individuals should be trained on how to use them.

Fire prevention measures in houses

- Keep attics and basements clean,
- Do not let children to play with fire,
- Use heaters and kitchen stoves carefully,
- Store flammable materials in appropriate places in your dwelling,
- Ensure regular maintenance of electrical installations to prevent fires that may be caused by electrical installations,
- Do not use unplastered, cracked, improperly constructed, or blocked chimneys,

- Have fire extinguishers in homes, ensure regular maintenance of fire extinguishers and learn how to use them.
- Evacuation time is very limited in residential fires, therefore, create an evacuation plan for homes.
- Early warning is particularly important in fires, therefore, if possible, have several smoke detectors in each dwelling and have them maintained regularly.

METHODS USED IN FIRE EXTINGUISHING

Cooling:

- Cooling with water: The most effective method to extinguish the fire is to smother the flammable material and taking the heat from it.
- Dispersal of the burning material: Dispersing the burning material splits the high heat caused by the fire, as the heat decreases, the fire gradually extinguishes.
- Strong Blowing: Firmly blowing onto the burning material reduces the heat of the burning material and causes the flame to extinguish.

The method of extinguishing by cooling achieves success in initial fires.

Smothering:

- Covering: Extinguishing by cutting the contact of the burning material with oxygen using solid substances such as sand, soil, carpets, rugs, and chemical compounds such as foam, chlorine, nitrogen, etc.
- Smothering: Extinguishing by cutting off or reducing the contact of the fire with oxygen. Particularly employed in fires occurring indoors.
- Removal of the flammable material: Extinguishing the fire by removing the flammable material responsible for ignition.

WHAT ARE FIRE EXTINGUISHING AGENTS?

- Water: The most effective agent for extinguishing fires. Water is particularly effective for Class A (solid) fires and is an excellent extinguishing agent.
- Sand: Used to extinguish fires by cutting off the contact of the burning material with oxygen.
- Carbon dioxide gas (CO₂): Covering the burning material, CO₂ gas extinguishes the fire by depriving it of oxygen.
- Dry Chemical Powders: According to their types, chemical powders can effectively extinguish class A, B, and C fires.
- Foam entirely covers the burning surface. As a result, it cuts off its contact with air. Additionally, it is used as a fire extinguisher due to its cooling properties.

FIRE EXTINGUISHERS SHOULD BE:

- Kept in an easily accessible place.
- In a location known to everyone.
- Securely fixed to the wall.
- Maintained yearly by the relevant company.
- Refilled after each use.

HOW TO USE FIRE EXTINGUISHERS?

- Pull the pin,
- Aim at the base of the fire,
- Squeeze the handle,
- Sweep

WHAT SHOULD YOU DO IN THE EVENT OF A FIRE?

- Stay calm. If there is a fire alarm nearby, push the button.
- Dial 110 to report the fire to the fire department. Report the address of the fire as accurately and quickly as possible, along with the type of fire if known (building, gasoline, wood, vehicle, etc.).
- If possible, use any means available to extinguish the fire until the fire brigade arrives.
- If the fire is indoors, close the doors and windows to prevent its spread.
- Do not endanger yourself or others while taking these actions.
- If the fire has intensified and you are not able to leave the building, do not hide under beds or in closets but try to communicate with people outside through the window.
- To avoid suffocation from smoke, move by bending over and crawling until help arrives, and breathe through a wet cloth or handkerchief covering your mouth and nose.
- If the smell of smoke or burning is coming from another room, do not touch or open the doors.
- If your clothes are on fire, do not run, lie down and roll over. Try to smother the flames with blankets and such covers.
- If you have any burns on your body, cool them with cold water immediately.

WILDFIRES

CAUSES OF WILDFIRES

- Wildfires caused by negligence and carelessness:

- Lighting fires in the forest without taking safety precautions.
- Leaving a fire unextinguished.
- Throwing unextinguished cigarette butts and matches on the ground.
- Burning unwanted weeds or stubble in forests or adjacent fields.
- Walking through the forest at night with a fire for illumination,
- Leaving glass and glass shards in the forest.
- Children playing with fire in the forest.
- Deliberately set wildfires:
- Intentionally burning forests to expand fields or pastures.
- Setting a fire to hide illegal activities in the forest.
- Setting a fire to take revenge on someone or to sabotage something.
- Setting a fire to drive away wild animals.

Source: General Directorate of State Meteorology Affairs

THE DAMAGES OF WILDFIRES

- Cause great damage to biological diversity.
- Destroy habitats of living organisms in forests.
- Due to the destruction of vegetation and land cover, causes an increase in the frequency and rapidity of natural disasters such as erosion, floods, landslides, and air pollution.
- Causes disruptions in the climate system by directly affecting temperature, wind, humidity, and precipitation.
- Negatively impact sectors such as tourism, health, sports, and hunting that rely on forests and forest products.

Flood

WHAT ARE THE GENERAL MEASURES AGAINST FLOODS?

- Early warning units should be established using radar systems and satellite data, which are highly effective in determining precipitation areas and intensities for all types of meteorological disasters.
- Rescue units that will work in coordination with these warning units should be formed in provinces and districts.
- Regional radios should inform the public in the event of a disaster and guide them on the procedures they will follow.
- Local administrations should be meticulous about not allowing settlement in stream beds and should prevent settlement in these areas.
- Drainage channels passing through residential areas, as well as channels where rivers and streams meet the sea should be regularly cleaned to prevent blockages and kept open.

- Riverbeds passing through residential areas should be improved.
- Green areas in the vicinity should be preserved and increased to prevent erosion and floods.
- Terracing and afforestation should be carried out on steep slopes that have risk of flooding.
- In low-lying areas, since there is a high risk of flooding in the basement floors of buildings, basements should not be constructed in such places, and the height of the plinth level should be kept high.
- There should be an adequate number of rainwater channels in urban areas, and their maintenance should be carried out regularly.
- Learn about flood warning signs and warning systems in your area of residence.
- Houses should be insured against floods, just like they should be insured against other disasters.

WHAT TO DO DURING A FLOOD

- You may place portable barriers to protect windows and doors.
- You may divert debris carried away by water with sandbags to keep it away from your property.
- In some cases, it may be a better idea to open all doors to allow water to flow out of the building, as this can prevent water pressure from damaging the structure of the building.
- Immediately evacuate stream beds and low-lying areas.
- Immediately leave the flood zone and move to higher and safer areas, but never attempt to cross moving water as it can suddenly deepen.
- Stay away from electrical sources, you could get electrocuted!
- Be especially cautious at night, since the dangers of flood can be particularly difficult to spot.
- Most flood-related deaths occur from entering floodwaters. Because ankle-deep floodwater can sweep you away and knee-deep floodwater can sweep cars away. **NEVER ENTER FLOODWATERS TO ESCAPE FROM THE FLOOD!**
- Floodwater also contains sewage and toxic chemicals. Do not allow children to play in floodwaters.
- Shut off electricity and water valves when evacuating the houses.
- During a flood, electricity may be cut off. If you suspect a gas leak in the building, do not use any electrical appliances or lights. Use battery-powered flashlights if you need illumination.
- Fill the bathtub and containers in your home with clean water in case the mains water gets contaminated. **IF YOU ARE IN A VEHICLE DURING A FLOOD:**
- Never attempt to drive through roads covered with water. Half of the deaths caused by flash floods occur in vehicles. Never drive in areas where floodwater is present.

- If there is any malfunction in the vehicle, abandon it immediately and seek higher ground. As flowing water may fill the roads, if the vehicle is stuck in moving water at a height of 60cm, water may lift and sweep the vehicle away.

WHAT TO DO AFTER A FLOOD

- The flood may not end when the waters recede. Therefore, do not enter the buildings unless authorities instruct you to do so and without inspecting the damage.
- Use waterproof shoes and battery-powered flashlights when inspecting the buildings.
- Check the damaged walls, floors, and windows in houses and the risk of falling materials such as ceilings and plaster.
- Take photos of the damages for insurance procedures.
- Secondary disasters such as fires may occur after a flood. Therefore, ensure that there are no gas leaks, submerged electrical components, gas appliances, stoves, and electrical appliances in the house.
- If there is food left in your house after the flood, never eat them (including canned food).
- Slowly drain floodwater from the house to prevent further damage.
- Sewage pits, contaminated tanks, and wastewater systems must be inspected by authorities to ensure that they do not pose health risks after the flood.
- Snakes and other harmful animals may enter the house during floods. Be careful in this regard.
- Help disaster victims who require special attention such as the elderly, infants, and disabled individuals.

PREVENTION AND MITIGATION OF LANDSLIDE DAMAGES

AREAS PRONE TO LANDSLIDES:

- Former landslide areas
- Tops and toes of natural slopes
- Tops and toes of old embankments
- Tops and toes of very steep and deep slopes
- Hilly areas with dense settlement and where waste management systems are present

AREAS CONSIDERED SAFE FROM LANDSLIDES:

- Slopes formed by hard and massive rocks where no movement has occurred in the past
- Relatively low-sloped terrains with no sudden changes in slope gradient
- Tops or surroundings of ridge points

WHAT SHOULD BE DONE WHEN THERE IS SUSPICION OF A LANDSLIDE HAZARD?

- Immediately contact local authorities.
- Inform those around you that may be affected by the landslide.
- Evacuate buildings.

WHAT TO DO DURING A LANDSLIDE

IF YOU ARE INDOORS:

- Stay inside if you do not have enough time to leave the building and move away from the landslide area.
- Form a triangle of life under or next to sturdy objects and perform the DROP, COVER, and HOLD ON action.

IF YOU ARE OUTDOORS:

- Stay away from the path of the landslide or mudflow at the moment of danger, quickly get as high as possible and warn people around you about the landslide.
- If you do not have enough time to escape from the mudflow and debris or if there are no sturdy objects to take cover behind, protect your head and neck by performing the DROP, COVER, and HOLD ON action.

WHAT TO DO AFTER A LANDSLIDE

- First, ensure your own safety. If necessary, move away from the danger zone to a safe location.
- Immediately turn off nearby sources of electricity, gas, and water. Do not try to illuminate your surroundings with matches or other flammable materials or electrical appliances until you are sure that there are no gas leaks. Use a flashlight.
- If there are injured or people in need of assistance nearby, do not move them unless there is a risk of another danger such as fire or another landslide.
- Warn those around you about dangerous walls, roofs, and chimneys, and do not walk around them.
- Listen to the instructions through mass communication channels such as radio and television.
- Keep streets and roads empty for emergency vehicles.
- Do not enter damaged buildings to retrieve belongings.

RESPONSIBILITIES FOR MINIMIZING THE DAMAGE CAUSED BY LANDSLIDES

RESPONSIBILITIES OF INDIVIDUALS

- Being informed about potential geological disasters in the area you live.
- Consulting geologists and engineers regarding areas prone to landslides.
- Avoiding excavations that remove support at the base of steep slopes and construction at the edges or bases of steep slopes, and also, refraining from dumping fill material on steep slopes.
- Obtaining information from relevant institutions and organizations before purchasing and sharing land, and taking construction decisions accordingly.

RESPONSIBILITIES OF LOCAL AUTHORITIES AND TECHNICAL STAFF

- Adequate geoscience and engineering surveys should be conducted in settlement areas.
- Local governments should prepare sensitivity maps that identify areas prone to landslides and other disasters through land surveys and evaluations when determining new settlement areas, providing data to engineers and urban planners to avoid high-risk areas through these maps.

Appendix E – CUSTOMIZED MULTIDIMENSIONAL QUALITY METRICS FRAMEWORK

Top-level Error Type	Error Subtype	Definition	Example
Accuracy		Errors occurring when the target content does not accurately correspond to the propositional content of the source text because of distortion, omission, or addition to the message.	
	Mistranslation	Error occurring when the target content that does not accurately represent the source content.	A source text states that a medicine should not be administered in doses greater than 200 mg, but the translation states that it should be administered in doses greater than 200 mg (i.e., negation has been omitted).
	Overtranslation	Error occurring in the target content that is inappropriately more specific than the source content.	The source text refers to a boy, but is translated with a word that applies only to young boys rather than the more general term.
	Undertranslation	Error occurring in the target content that is inappropriately less specific than the source content.	The source content uses words that refer to a specific type of military officer, but the target content refers to military officers in general.
	Omission	Error where content present in the source is missing in the target.	A paragraph present in the source is missing in the translation.
	Untranslated	Error occurring when a text	A sentence in a

		segment that was intended for translation is omitted in the target content.	Japanese document translated into English is left in Japanese.
Linguistic Conventions		Errors related to the linguistic well-formedness of the text, including problems with grammaticality, idiomaticity, and mechanical correctness.	
	Grammar – Word form	Error in selecting the appropriate morphological variant of a word.	ad became for had become, sheeps for sheep.
	Grammar – Word order	Word order non-compliant with target language norms.	A German text reads “Er hat gesehen den Mann” instead of “Er hat den Mann gesehen.”
	Grammar – Function words	Error in a word that serves to connect important information and is critical for understanding because it defines the relationships between other content words such as nouns, verbs, and the like.	1) A text reads “Check the part number as given in the screen” instead of “on the screen”. 2) A text reads “The graphic is then copied into an internal memory” instead of “The graphic is copied to internal memory.”
	Punctuation	Punctuation incorrect according to target language conventions.	1) An English text uses a semicolon where a comma should be used. 2) A two-digit year reference begins with an open single quote instead of a close single quote (apostrophe). 3) A Greek text uses a

			question mark instead of the anticipated semicolon to express a question.
	Spelling - Capitalization	Error where one or more letters in a word are written with nonstandard upper- and lowercase letter forms, considering the textual setting and applicable locale conventions.	1) The name of the Canadian comedian Norm Macdonald is written incorrectly as Norm MacDonald. 2) The company name eBay is incorrectly styled as EBay at the beginning of a sentence, rather than the preferred form eBay, shown correctly in this sentence: “eBay Inc. is a successful e-commerce company based in San Jose, California.”
	Duplication	Content (e.g., a word or longer portion of text) repeated unintentionally.	1) “The man the man whom she saw...” 2) A paragraph appears verbatim twice in a row. 3) Changes in sentence structure and the like when rendering the target language can result in inappropriate tagging in the target content.
	Textual Conventions – Cohesion	Portions of the text needed to connect it into an understandable whole (e.g., reference, substitution, ellipsis, conjunction, and lexical cohesion) missing or incorrect.	The contact tracing tool the external team the health department hired developed has caused a privacy breach.
	Textual Conventions -	Text lacking a clear semantic relationship	

	Coherence	between its parts, i.e., the different parts don't hang together, don't follow the discourse conventions of the target language, or don't "make sense."	
Style		Errors occurring in a text that are grammatically acceptable but are inappropriate because they deviate from organizational style guides or exhibit inappropriate language style.	
	Awkward	Style involving excessive wordiness or overly embedded clauses, often due to inappropriate retention of source text style in the target text.	A text is written with many embedded clauses and an excessively wordy style. While the intended meaning can be understood, and the text is grammatically correct, the text is very awkward and difficult to follow. "However, a personal language variety (in such approaches called "idiolect") usually is internally heterogeneous (it varies in particular according to different situations and/or media) and therefore not suitable to serve as the smallest unit of linguistic variation, whereby in contrast,

			idiolects according to the framework developed in this document, are homogeneous by definition, whereas personal varieties are sets of idiolects.”
	Unidiomatic	Style that is grammatical, but unnatural.	The following text appears in an English translation of a German letter: “We thanked him with heart” where “with heart” is an understandable, but non-idiomatic rendering, better stated as “heartily”.
Terminology		Errors arising when a term does not conform to normative subject field or organizational terminology standards or when a term in the target content is not the correct, normative equivalent of the corresponding term in the source content.	
	Wrong term	Use of term that it is not the term a domain expert would use or because it gives rise to a conceptual mismatch.	The word 'river' in an English source text is translated into French as 'rivière'. But the river in question flows into the sea, not into a lake or another river, so the correct French translation should have been 'fleuve'.
	Inconsistent use	Use of multiple terms for	The text refers to a

	of terminology	the same concept in cases where consistency is desirable.	component as the 'brake release lever', 'brake disengagement lever', 'manual brake release', and 'manual disengagement release'.
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Appendix F – DEFINITION OF ERROR SEVERITY LEVELS

Level	Description
Neutral	Severity level of an error that differs from a quality evaluator's preferential translation or that is flagged for the translator's attention but is an acceptable translation.
Minor	Severity level of an error that does not seriously impede the usability, understandability, or reliability of the content for its intended purpose, but has a limited impact on, for example, accuracy, stylistic quality, consistency, fluency, clarity, or general appeal of the content.
Major	Severity level of an error that seriously affects the understandability, reliability, or usability of the content for its intended purpose or hinders the proper use of the product or service due to a significant loss or change in meaning or because the error appears in a highly visible or important part of the content.
Critical	Severity level of an error that renders the entire content unfit for purpose or poses the risk for serious physical, financial, or reputational harm.

APPENDIX G – ERROR TABLE OF DEEPL TRANSLATOR

Error Type & Subtype	Severity Level				Total
	Neutral	Minor	Major	Critical	
Accuracy	3	10	3	6	22
Mistranslation	0	5	2	6	13
Overtranslation	1	2	0	0	3
Undertranslation	2	3	0	0	5
Omission	0	0	0	0	0
Untranslated	0	0	1	0	1
Linguistic Conventions	10	16	1	0	27
Grammar – Word form	0	4	0	0	4
Grammar – Word order	0	0	0	0	0
Grammar – Function words	1	5	0	0	6
Spelling - Capitalization	0	0	0	0	0
Punctuation	0	1	0	0	1
Duplication	0	2	0	0	2
Textual Conventions - Coherence	0	0	0	0	0
Textual Conventions - Cohesion	9	4	1	0	14
Style	1	13	0	0	14
Awkward	1	6	0	0	7
Unidiomatic	0	7	0	0	7
Terminology	2	23	1	0	26
Inconsistent use of terminology	0	5	0	0	5
Wrong term	2	18	1	0	21
Total	16	62	5	6	89

Appendix H – ERROR ANNOTATION OF DEEPL TRANSLATOR

Source Text	DeepL Translator	Error Type	Error Subtype	Severity
Okulda sınıfta ya da büroda ise sağlam sıra, masa altlarında ve ya yanında; koridora ise duvarın yanına hayat üçgeni oluşturacak şekilde <u>ÇÖK-KAPAN-TUTUN</u> hareketi ile baş ve boyun korunmalıdır.	If in a classroom or office at school, the head and neck should be protected under or next to sturdy desks, desks or tables; if in a corridor, the head and neck should be protected by forming a life triangle next to the wall with the <u>SQUAT-SLAM-HOLD-HOLD</u> movement.	Accuracy	Mistranslation	Critical
Mutfak, imalathane, laboratuvar gibi iş aletlerinin bulunduğu yerlerde; ocak, fırın ve bu gibi cihazlar kapatılmalı, dökülebilecek malzeme ve maddelerden <u>uzaklaşılmalıdır.</u>	In places where there are work tools such as kitchens, workshops, laboratories; stoves, ovens and such devices should be turned off, and materials and substances that may spill <u>should be removed.</u>	Accuracy	Mistranslation	Critical
Havayı <u>kesme:</u>	<u>Do not cut the air:</u>	Accuracy	Mistranslation	Critical
<u>Sık,</u>	<u>Frequently</u>	Accuracy	Mistranslation	Critical
Sağlam eşyaların altında ve ya yanında hayat üçgeni oluşturarak <u>ÇÖK-KAPAN-TUTUN</u> hareketini uygulayın.	Form a life triangle underneath or next to sturdy objects and practice the <u>CRUMP-CAPTURE-HOLD.</u>	Accuracy	Mistranslation	Critical
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa <u>ÇÖK-KAPAN-TUTUN</u> hareketi ile başınızı ve boynunuzu koruyun.	If you do not have time to escape the flow of mud and debris, or if there is no sturdy structure to hide behind, protect your head and neck with the <u>FALL-CAPTURE-HOLD.</u>	Accuracy	Mistranslation	Critical
<u>Çığa yakalanırsanız!</u>	<u>Caught</u> in an avalanche!	Accuracy	Mistranslation	Major
Sonra çevrenizde <u>yardım edebileceğiniz kimse</u> olup olmadığını kontrol edin.	Then check if there is anyone around you <u>who can help.</u>	Accuracy	Mistranslation	Major
<u>Sel</u>	<u>Sel</u>	Accuracy	Untranslated	Major
Sarsıntı sırasında bir tünelin içinde iseniz ve çıkışa yakın değilseniz;	If you are in a tunnel during a tremor and you are not close to the exit, <u>the vehicle should be</u>	Linguistic Conventions	Textual Conventions – Cohesion	Major

araç durdurulup aşağıya inilmeli ve yanına yan yatarak ayaklar karına çekilip, ellerle baş ve boyun korunmalıdır. (ÇÖK-KAPAN-TUTUN)	<u>stopped, go down and lie on your side, feet on your stomach, and protect your head and neck with your hands.</u> (CRASH-CAPTURE-HOLD)			
Çukur alanlarda, binaların bodrum katlarına su basma tehlikesi yüksek olduğundan, bu türlü yerlerde bodrum yapılmamalı, <u>su basman kotu</u> yüksek tutulmalıdır.	Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and <u>the water level</u> should be kept high.	Terminology	Wrong term	Major
Yerden destek alarak <u>yüzme hareketi ile</u> çıkış yüzeyinde kalmaya çalışılmalıdır.	Attempt to stay on the avalanche surface <u>by swimming</u> with support from the ground	Accuracy	Undertranslation	Minor
Tekerlekli sandalyede isek <u>tekerlekler kilitlenerek</u> baş ve boyun korumaya alınmalıdır.	If we are in a wheelchair, the <u>wheels should be locked to</u> protect the head and neck.	Accuracy	Mistranslation	Minor
Sarsıntı geçtikten sonra elektrik, gaz ve su vanalarını kapatılmalı, soba ve <u>ısıtıcılar söndürülmelidir.</u>	After the tremor passes, electricity, gas and water valves should be turned off, stoves and <u>heaters should be extinguished.</u>	Accuracy	Mistranslation	Minor
Battaniye türü örtüler <u>alınarak</u> alevler boğulmaya çalışılmalıdır.	<u>Blankets should be taken</u> and the flames should be smothered.	Accuracy	Undertranslation	Minor
Sel sırasında evinizde kalmış yiyecekler varsa bunları <u>kesinlikle kullanmayın.</u> (Konservelerde dahil)	If you have leftover food in your home during the flood, <u>do not use</u> it (including canned food).	Accuracy	Undertranslation	Minor
<u>Eşya</u> almak için zarar görmüş binalara girmeyin.	Do not enter damaged buildings to retrieve <u>goods.</u>	Accuracy	Overtranslation	Minor
<u>Zehirli</u> , patlayıcı, yanıcı maddeler düşmeyecek bir konumda sabitlenmeli ve kırılmayacak bir şekilde depolanmalıdır.	<u>Venomous,</u> explosive and flammable substances must be secured in a position where they will not fall and stored in a way that will not break.	Accuracy	Overtranslation	Minor
<u>Şehir içlerinde</u> yeterince yağmur suyu kanalı olmalı	There should be enough rainwater channels in the <u>inner</u>	Accuracy	Mistranslation	Minor

ve bunların sürekli bakımları yapılmalıdır.	<u>cities</u> and they should be constantly maintained.			
<u>Organizasyon bakımından yangından korunma:</u>	Fire protection <u>in terms of organization:</u>	Accuracy	Mistranslation	Minor
Güvenli bir yer bulup, diz üstü CÖK Başını ve enseni koruyacak şekilde KAPAN Düşmemek için sabit bir yere TUTUN	Find a safe place and <u>get down on</u> your knees COVER to protect your head and neck HOLD on to a stable place to avoid falling	Accuracy	Undertranslation	Neutral
Kıyafetiniz alev almışsa; <u>koşmadan durup</u> yere yatarak yuvarlanılmalıdır.	If your clothes are on fire, you <u>should stop running</u> and roll on the ground.	Accuracy	Undertranslation	Neutral
İklim sisteminde (sıcaklık, rüzgâr, nem ve yağışa doğrudan etki ederek) <u>bozulmalar görülür.</u>	<u>There are disruptions</u> in the climate system (with a direct impact on temperature, wind, humidity and precipitation).	Accuracy	Overtranslation	Neutral
Araçta herhangi bir arıza oluştuysa hemen terk edilerek <u>yüksek bir yere çıkılmalıdır.</u>	If there is any malfunction in the vehicle, it should be abandoned immediately and <u>moved to higher ground.</u>	Accuracy	Mistranslation	Minor
Bayılacağınızı hissediyorsanız, buna direnmemelidir. Çünkü <u>baygın bir insan</u> daha az oksijen tüketir.	If you feel that you are going to faint, you should not resist it. Because <u>a fainting person</u> consumes less oxygen.	Linguistic Conventions	Grammar – Word form	Minor
Her türlü işyerinde yangın söndürme tüpü bulundurulmalı, düzenli bakımları yaptırılmalı ve <u>nasıl kullanılacağı öğrenilmelidir.</u>	Fire extinguishers should be available in all workplaces, regularly maintained and <u>learned how to use them.</u>	Linguistic Conventions	Textual Conventions – Cohesion	Minor
Konutların duvarlarında, <u>katlardaki zeminlerde</u> ve pencerelerdeki hasarlar, tavan, sıva vb. malzemelerin dökülmesi riskinin olup olmadığı kontrol edilmelidir.	The walls, <u>floors, floors</u> and windows of the houses should be checked for damages and the risk of spillage of materials such as ceilings, plaster, etc.	Linguistic Conventions	Duplication	Minor
Çığın <u>büyüklüğüne, hızına, patika genişliğine</u> , etraftaki araçlara veya doğal cisimlere bağlı olarak bulunulan alandan	Depending on the size of the <u>avalanche, speed</u> , width of the path, surrounding vehicles or natural objects, a decision should be made to leave the	Linguistic Conventions	Grammar – Function words	Minor

ayrılmaya karar verilmelidir.	area.			
<u>Tavan ve duvara asılan avize, klima vb. cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağa ve kanca ile asılmalıdır.</u>	<u>Ceiling and wall hung chandeliers, air conditioners, etc.</u> should be hung with hooks far enough away from the walls and windows to support their weight.	Linguistic Conventions	Textual Conventions – Cohesion	Minor
<u>Bir afet ve acil durumda eve ulaşamayacak durumlar için</u> aile bireyleri ile iletişimin nasıl sağlayacağı, alternatif buluşma yerleri ve bireylerin ulaşabileceği bölge dışı bağlantı kişisi (ev, işyeri, okul içinde, dışında ve ya mahalle dışında) belirlenmelidir.	<u>In the event of a disaster and emergency,</u> how to ensure communication with family members, alternative meeting places and an out-of-area contact person (<u>inside, outside the home, workplace, school, outside or outside the neighborhood</u>) should be determined <u>for situations where the home cannot be reached.</u>	Linguistic Conventions	Textual Conventions – Cohesion	Minor
Yapılar deprem etkilerine karşı dayanıklı inşa edilmelidir. (Yapı Tekniğine ve İnşaat Yönetmeliğine uygun olarak)	Buildings should be built resistant to earthquake effects (in accordance with Building Technique and Construction Regulations)	Linguistic Conventions	Punctuation	Minor
Bina yönetimince önceden belirlenen, mesken veya işyerinin özelliği ve büyüklüğüne göre uygun yangın söndürme cihazı mutlaka bulundurulmalı ve periyodik bakımları da yaptırılmalıdır. Bu cihazlar;	A fire extinguisher suitable for the characteristics and size of the residence or workplace, determined in advance by the building management, must be available and <u>periodic maintenance</u> must be carried out.	Linguistic Conventions	Grammar – Function words	Minor
<u>DEPREM ANINDA BİNA İÇERİSİNDEYSENİZ;</u>	<u>IF YOU ARE INSIDE THE BUILDING DURING AN EARTHQUAKE;</u>	Linguistic Conventions	Grammar – Function words	Minor
Diğer güvenlik önlemlerini alınarak gerekli olan eşya ve malzemeler alınarak bina daha önce tespit edilen yoldan derhal terk edilip toplanma bölgesine	Other safety precautions should be taken and the necessary belongings and materials should be taken and the building should be left immediately from the	Linguistic Conventions	Grammar – Word form	Minor

<u>gidilmelidir.</u>	previously determined route and <u>go to</u> the assembly area.			
Okulda sınıfta ya da büroda ise sağlam <u>sıra</u> , <u>masa</u> altlarında ve ya yanında; koridorsa ise duvarın yanına hayat üçgeni oluşturacak şekilde <u>ÇÖK-KAPAN-TUTUN</u> hareketi ile baş ve boyun korunmalıdır.	If in a classroom or office at school, the head and neck should be protected under or next to sturdy <u>desks, desks</u> or tables; if in a corridor, the head and neck should be protected by forming a life triangle next to the wall with the SQUAT-SLAM- <u>HOLD-HOLD</u> movement.	Linguistic Conventions	Duplication	Minor
Araç meskun mahallerde ya da güvenli bir yerde değilse(ağaç ya da enerji hatları veya direklerinin yanında, köprü üstünde vb.); durdurulmalı, kontak anahtarı üzerinde bırakılarak terk edilmeli ve trafikten uzak açık alanlara <u>gidilmelidir.</u>	If the vehicle is not in a residential area or in a safe place (near trees or power lines or poles, on a bridge, etc.); it should be stopped, left with the ignition key on and abandoned and <u>go to</u> open areas away from traffic.	Linguistic Conventions	Grammar – Word form	Minor
Yerinden oynayan telefon ahizelerini <u>telefonun üstüne koyun.</u>	Put the displaced telephone handsets on top of <u>the phone</u> .	Linguistic Conventions	Grammar – Function words	Minor
<u>Tavan arası</u> ve bodrumlar temiz tutulmalıdır,	<u>The attic</u> and basements must be kept clean	Linguistic Conventions	Grammar – Function words	Minor
Konutlarda da yangın söndürme tüpü bulundurulmalı, düzenli bakımları yaptırılmalı ve <u>nasıl kullanılabileceği öğrenilmelidir.</u>	Households should also be equipped with fire extinguishers, have them regularly maintained and <u>learn how to use them</u>	Linguistic Conventions	Textual Conventions – Cohesion	Minor
Bir kez kullanıldıktan sonra mutlaka tekrar <u>doldurulmalıdır.</u>	Once used, it <u>must be refill.</u>	Linguistic Conventions	Grammar – Word form	Minor
Kolayca ulaşılabilir bir yerde tutulmalıdır.	<u>It</u> should be kept in an easily accessible place.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Yeri herkes tarafından bilinmelidir.	<u>Its</u> place must be known by all.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Duvara sıkıca	<u>It</u> must be firmly fixed to the	Linguistic	Textual	Neutral

sabitlenmelidir.	wall.	Conventions	Conventions - Cohesion	
Her yıl ilgili firma tarafından bakımı yapılmalıdır.	<u>It</u> must be maintained by the relevant company every year.			
Bir kez kullanıldıktan sonra mutlaka tekrar doldurulmalıdır.	Once used, <u>it</u> must be refilled.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Kolayca ulaşılabilir bir yerde tutulmalıdır.	<u>It</u> should be kept in an easily accessible place.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Yeri herkes tarafından bilinmelidir.	<u>Its</u> place must be known by all.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Duvara sıkıca sabitlenmelidir.	<u>It</u> must be firmly fixed to the wall.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Her yıl ilgili firma tarafından bakımı yapılmalıdır.	It must be maintained by the relevant company every year.	Linguistic Conventions	Textual Conventions - Cohesion	Neutral
Özellikle geceleri, selin tehlikelerini görmek <u>güçleştireceğinden</u> daha dikkatli olunmalıdır.	Be extra careful, especially at night, <u>when</u> it is difficult to see the dangers of flooding.	Linguistic Conventions	Grammar - Function words	Neutral
<u>Ağız sıkıca kapatılmalı, hava kesesi oluşturmaya çalışılmalıdır, bu arada baş sağa sola doğru çevrilmeye çalışılmalıdır.</u>	<u>Close the mouth tightly and try to create an air sac, while turning the head from side to side.</u>	Style	Awkward	Minor
Akış esnasında oturma pozisyonu almaya çalışarak (eller ve bacaklar bitişik) <u>çığ durmadan önce bacaklar ile yer sertçe itilip (eğer zemin altta veya zemindeki kar setleşmeye başlamış ise) kalkılmaya çalışılmalıdır.</u>	During the flow, try to take a sitting position (hands and legs together) and try to get up before the avalanche stops <u>by pushing the ground hard with the legs (if the ground is at the bottom or the snow on the ground has started to set).</u>	Style	Awkward	Minor
<u>Bu önlemlerin yanı sıra, yapısal olmayan, yani binadan değil de eşyalardan kaynaklanacak hasarlardan korunmak için günlük kullandığımız eşyalarımızın ev içerisine</u>	<u>In addition to these precautions, we should take the following precautions in placing our daily-used items inside the house to protect against non-structural damage, that is, damage caused by the items,</u>	Style	Awkward	Minor

<u>verleřtirilmesinde ařaęıda sayılan önlemleri almalıyız:</u>	<u>not the building:</u>			
Önemli evrakların (kimlik kartları, tapu, sigorta belgeleri, saęlık karnesi, diplomalar, pasaport, banka cüzdanı vb.) kopyaları hazırlanarak <u>su geçirmeyecek bir şekilde</u> saklanmalı, ayrıca bu evrakların bir örneęi de bölge dıřı baęlantı kiřisinde bulunmalıdır.	Copies of important documents (identity cards, title deeds, insurance documents, health certificates, diplomas, passports, bankbooks, etc.) should be made and <u>stored in a watertight place</u> , and a copy of these documents should also be kept with the out-of-region contact person	Style	Unidiomatic	Minor
<u>Kesinlikle panik yapılmamalıdır.</u>	<u>There should be absolutely no panic.</u>	Style	Unidiomatic	Minor
Artçı depremler <u>hasarlı binalarda zarara yol açabilir.</u>	Aftershocks <u>can cause damage to damaged buildings.</u>	Style	Awkward	Minor
<u>Özellikle</u> kapalı yerlerde oluřan yangınlara uygulanır.	It is <u>especially</u> applied to fires occurring in closed places.	Style	Unidiomatic	Minor
Kum: Yanıcı maddelerin oksijenle <u>iliřkisinin</u> kesilerek söndürölmesinde kullanılır.	Sand: It is used to extinguish flammable materials by cutting their <u>relationship</u> with oxygen	Style	Unidiomatic	Minor
<u>Telařa kapılmadan</u> çevrede yangın ihbar düęmesi varsa ona <u>basılmalıdır.</u>	If there is a fire alarm button in the vicinity, it <u>should be pressed without panic.</u>	Style	Awkward	Minor
Bazı durumlarda bütün kapıları açarak suyun binanın içinden akmasına izin vermek çok daha iyidir; böylece su basıncının <u>yapının taşıyıcı sistemine zarar vermesi önlenebilir.</u>	In some cases it is much better to open all the doors and let the water flow through the building, so that the <u>water pressure can be prevented from damaging the structural system of the building.</u>	Style	Awkward	Minor
Elektrik kaynaklarından uzak durulmalıdır, <u>elektrik çarpabilir!...</u>	Stay away from electrical sources, you may <u>get an electric shock!...</u>	Style	Unidiomatic	Minor
Binalar kontrol edilirken su geçirmez ayakkabı ve <u>pille çalışan</u> el fenerleri	Waterproof footwear and <u>battery-operated</u> flashlights should be used when checking	Style	Unidiomatic	Minor

kullanılmalıdır.	buildings.			
<u>Su ile Soğutma: Yanıcı maddeyi boğma ve yanıcı maddeden ısı alarak yangının söndürülmesinde en büyük etken olmaktadır.</u>	<u>Water Cooling: It is the biggest factor in extinguishing the fire by suffocating the combustible material and taking heat from the combustible material.</u>	Style	Awkward	Neutral
Araçta çubuk benzeri bir alet var ise <u>yukarı doğru batırılıp</u> aramaya gelenlerin çubuğu ve dolayısı ile yerimizi görmeleri sağlanmalıdır.	If there is a stick-like device in the vehicle, it should be <u>immersed upwards</u> so that the searchers can see the stick and therefore our location.	Style	Unidiomatic	Minor
Binadan acilen çıkmak için kullanılacak <u>yollardaki</u> tehlikeler ortadan kaldırılmalı, bu <u>yollar</u> işaretlemeli, çıkışı engelleyebilecek eşyalar <u>çıkış yolu</u> üzerinden kaldırılmalıdır.	Dangers on the <u>roads</u> to be used for emergency exit from the building should be eliminated, these <u>roads</u> should be marked, items that may prevent exit should be removed from the <u>exit road</u> .	Terminology	Wrong term	Minor
Diğer insanlar uyarılmalıdır. (ses, ıslık, <u>düdük</u> , korna, vb.)	Other people should be warned (voice, whistle, <u>whistle</u> , horn, etc.)	Terminology	Wrong term	Minor
Bazı olaylar sırt çantası taşıyan kişilerin <u>çığ topuğu</u> civarında, yüzeyde kalma şanslarının taşımayanlardan biraz daha fazla olduğunu göstermiştir.	Some incidents have shown that people carrying backpacks have a slightly better chance of staying on the surface around the <u>avalanche heel</u> than those not carrying them.	Terminology	Wrong term	Minor
Telsiz var ise çağrı yapılmalı ve telsiz sürekli <u>alıcı</u> konumunda tutulmalıdır.	If there is a radio, a call should be made and the radio should be kept in the <u>receiving</u> position at all times.	Terminology	Wrong term	Minor
<u>Karyolalar</u> pencerenin ve üzerine devrilebilecek ağır dolapların yanına konulmamalı, <u>karyolanın</u> üzerinde ağır eşya olan raf bulundurulmamalıdır.	<u>Cots</u> should not be placed near windows and heavy cabinets that may tip over, and there should be no shelves with heavy items on the <u>bed</u> .	Terminology	Inconsistent use of terminology	Minor
<u>Sabitlenmemiş</u> dolap, raf, pencere vb. eşyalardan uzak durulmalıdır.	<u>Unstabilized</u> cabinets, shelves, windows, etc. should be avoided.	Terminology	Inconsistent use of terminology	Minor
<u>Sarsıntı</u> geçene kadar bu	Wait in this position until the	Terminology	Wrong term	Minor

pozisyonunda beklenmelidir.	<u>shaking</u> subsides.			
<u>Sarsıntı</u> durduktan sonra açık alanlara gidilmelidir.	After the <u>shaking</u> stops, go to open areas.	Terminology	Wrong term	Minor
<u>Kapalı bir otoparkta</u> iseniz; araç dışına çıkılıp, yanına yan yatarak, ellerle baş ve boyun korunmalıdır.	If you are in a <u>closed parking lot</u> , get out of the vehicle, lie on your side and protect your head and neck with your hands.	Terminology	Wrong term	Minor
<u>Sarsıntı</u> bitinceye kadar metro ya da trenin içinde, sıkıca tutturulmuş askı, korkuluk veya herhangi bir yere tutunmalı, metro veya tren personeli tarafından verilen talimatlara uyulmalıdır.	Until the <u>shaking</u> is over, you should hold on to a tightly fastened hanger, railing or any other <u>place</u> inside the subway or train and follow the instructions given by the subway or train personnel.	Terminology	Wrong term	Minor
<u>KAPALI ALANDAYSANIZ;</u>	IF YOU ARE IN A <u>CLOSED AREA</u> ;	Terminology	Wrong term	Minor
<u>Yanıcı</u> maddeler konutun uygun yerinde saklanılmalıdır,	<u>Flammable</u> materials should be stored in an appropriate place in the dwelling,	Terminology	Inconsistent use of terminology	Minor
<u>Soğutarak</u> Söndürme:	<u>Quenching</u> by Cooling:	Terminology	Inconsistent use of terminology	Minor
<u>Boğma</u> : Yangının oksijenle temasının kesilmesi veya azaltılması amacıyla yapılan işlemidir.	<u>Asphyxiation</u> : It is the process carried out in order to cut off or reduce the contact of the fire with oxygen.	Terminology	Wrong term	Minor
<u>Yanıcı Maddenin Ortadan Kaldırılması</u> : Yanma koşullarından olan <u>yanıcı maddenin</u> ortadan kalkması sonucu yangının söndürülmesidir.	Elimination of <u>Flammable Material</u> : It is the extinguishing of the fire as a result of the elimination of the <u>combustible substance</u> , which is one of the conditions of combustion.	Terminology	Inconsistent use of terminology	Minor
Konutların duvarlarında, <u>katlardaki zeminlerde</u> ve pencerelerdeki hasarlar, tavan, sıva vb. malzemelerin <u>dökülmesi</u> riskinin olup olmadığı kontrol edilmelidir.	The walls, <u>floors, floors</u> and windows of the houses should be checked for damages and the risk of <u>spillage</u> of materials such as ceilings, plaster, etc.	Terminology	Wrong term	Minor
Doğal yamaçların üst ve <u>topuk kesimleri</u>	Top and <u>heel cuts</u> of natural slopes	Terminology	Wrong term	Minor
Eski dolguların üst ve <u>topuk kesimleri</u>	Top and <u>heel cuts</u> of old fillings	Terminology	Wrong term	Minor
Çok dik ve derin yamaçların üst ve <u>topuk</u>	Top and <u>heel cuts</u> of very steep and deep slopes	Terminology	Wrong term	Minor

<u>kesimleri</u>				
<u>Yamaç eğiminde</u> ani değişimlerin gözlenmediği nispeten düşük eğimli araziler	Relatively low slope lands where sudden changes in <u>slope</u> are not observed	Terminology	Wrong term	Minor
Heyelandan etkilenebilecek <u>çevre</u> bilgilendirilmelidir.	The <u>environment</u> that may be affected by landslides should be informed.	Terminology	Wrong term	Minor
<u>KAPALI ALANDAYSANIZ;</u>	IF YOU ARE IN A <u>CLOSED AREA;</u>	Terminology	Wrong term	Minor
Dik yamaçların <u>topuk kesiminde</u> desteği kaldırıcı kazı işlemlerinden ve dik yamaçların kenarında veya tabanında yapı inşasından kaçınmak, ayrıca <u>eğimi fazla yamaçların</u> üzerine dolgu malzemesi dökmek,	Avoiding excavation operations that remove support at the <u>heel of steep slopes</u> and construction of structures at the edge or base of steep slopes, and not pouring filling material on <u>slopes with high slopes</u> ,	Terminology	Wrong term	Minor
Sonra mahalle <u>toplanma noktanıza</u> gidin.	Then go to your neighborhood <u>rally point</u> .	Terminology	Wrong term	Neutral
Çevrenizde yaralı veya <u>yardıma muhtaç kişiler</u> varsa, yangın ve yeni bir heyelan gibi bir tehlike yoksa onları yerlerinden oynatmayın.	If there are injured or <u>helpless</u> people around you, do not move them unless there is a danger, such as a fire or a new landslide.	Terminology	Wrong term	Neutral

Appendix I – ERROR TABLE OF GOOGLE TRANSLATE

Error Type & Subtype	Severity Level				Total
	Neutral	Minor	Major	Critical	
Accuracy	3	16	5	5	29
Mistranslation	0	2	4	4	10
Overtranslation	0	1	1	0	2
Undertranslation	3	13	0	0	16
Omission	0	0	0	1	1
Untranslated	0	0	0	0	0
Linguistic Conventions	10	9	4	0	23
Grammar – Word form	0	2	0	0	2
Grammar – Word order	0	1	0	0	1
Grammar – Function words	0	3	0	0	3
Spelling - Capitalization	0	1	0	0	1
Punctuation	0	0	0	0	0
Duplication	0	0	1	0	1
Textual Conventions - Coherence	0	0	1	0	1
Textual Conventions - Cohesion	10	2	2	0	14
Style	2	13	0	0	15
Awkward	1	5	0	0	6
Unidiomatic	1	8	0	0	9
Terminology	4	29	1	0	34
Inconsistent use of terminology	0	4	0	0	4
Wrong term	4	25	1	0	30
Total	19	67	10	5	101

Appendix J – ERROR ANNOTATION OF GOOGLE TRANSLATE

Source Text	Google Translate	Error Type	Error Subtype	Severity
<u>Sarsıntı geçene kadar bu pozisyonda beklenmelidir.</u>		Accuracy	Omission	Critical
<u>Sık,</u>	<u>Chic,</u>	Accuracy	Mistranslation	Critical
Sağlam eşyaların altında ve ya yanında hayat üçgeni oluşturarak <u>ÇÖK-KAPAN-TUTUN</u> hareketini uygulayın.	Create a life triangle under or next to solid objects and apply the <u>CRASH-COVER-HOLD</u> movement.	Accuracy	Mistranslation	Critical
Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa <u>ÇÖK-KAPAN-TUTUN</u> hareketi ile başınızı ve boynunuzu koruyun.	If you do not have time to escape from mud and debris flow or if there is no solid structure around you to hide behind, protect your head and neck with the <u>CRASH-COVER-HOLD</u> movement.	Accuracy	Mistranslation	Critical
Okulda sınıfta ya da büroda ise sağlam sıra, masa altlarında ve ya yanında; koridorsa ise duvarın yanına hayat üçgeni oluşturacak şekilde <u>ÇÖK-KAPAN-TUTUN</u> hareketi ile baş ve boyun korunmalıdır.	At school, in a classroom or in an office, under or next to a sturdy desk or table; If it is a corridor, the head and neck should be protected with the <u>CRASH-COVER-HOLD</u> movement, forming a life triangle next to the wall.	Accuracy	Mistranslation	Critical
Toprak kayması olabilecek, taş veya kaya düşebilecek yamaç altlarında <u>bulunulmamalıdır.</u>	<u>It should not be located</u> under slopes where landslides or stones or rocks may fall.	Accuracy	Mistranslation	Major
<u>Araç</u> meskun <u>mahallerde</u> ya da <u>güvenli bir yerde</u>	<u>If the vehicle is not in residential areas or a safe place</u> (next to trees or	Accuracy	Mistranslation	Major

değilse(ağaç ya da enerji hatları veya direklerinin yanında, köprü üstünde vb.); durdurulmalı, kontak anahtarı üzerinde bırakılarak terk edilmeli ve <u>trafikten uzak açık alanlara gidilmelidir.</u>	power lines or poles, on a bridge, etc.); should be stopped, left with the ignition key on, and <u>driven to open areas away from traffic.</u>			
YIKINTI ALTINDA MAHSUR KALDIYSANIZ;	IF YOU ARE TRAPPED UNDER <u>DEMOLITION</u> ;	Accuracy	Overtranslation	Major
Eğer alevler çoğalmışsa ve binadan çıkış olanaksızsa, <u>yatak altlarına dolaplara saklanılmamalı, pencereden dışarıdakilerle iletişim kurulmaya çalışılmalıdır.</u>	If the flames have increased and it is impossible to exit the building, <u>one should not hide in cupboards under the bed and try to communicate with people outside through the window.</u>	Accuracy	Mistranslation	Major
Kırılmış ağaç ve kaya parçalarından <u>korunmaya çalışılmalıdır.</u>	Efforts should be made to <u>protect it from broken trees and rocks.</u>	Accuracy	Mistranslation	Major
Tavan ve duvara asılan avize, klima vb. cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağa ve kanca ile asılmalıdır.	Chandeliers, air conditioners, etc. hanging on the ceiling and <u>wall. Devices</u> should be hung with hooks, far enough away from walls and windows to support their weight.	Linguistic Conventions	Textual Conventions- Cohesion	Major
Çünkü ayak bileğimize kadar olan sel suyu <u>bizi</u> ; dizimize kadar olan sel suları ise otomobillerimizi sürükleyip götürebilir.	Because the flood water up to our ankles <u>made us</u> ; Flood water up to our knees can wash away our cars.	Linguistic Conventions	Textual Conventions- Coherence	Major
Konutların duvarlarında, katlardaki zeminlerde ve pencerelerdeki hasarlar,	Damages to the walls of residences, floors and windows, ceilings, <u>plaster,</u>	Linguistic Conventions	Textual Conventions- Cohesion	Major

tavan, sıva vb. malzemelerin dökülmesi riskinin olup olmadığı kontrol edilmelidir.	etc. <u>It</u> should be checked whether there is a risk of spilling the materials.			
<u>Lağım çukurları, mikroplu tanklar</u> ve atık su sistemleri sel sonrası insan sağlığına zarar vermemeleri için mutlaka yetkililere kontrol ettirilmelidir.	<u>Septic tanks, septic tanks</u> and wastewater systems must be checked by the authorities to ensure that they do not harm human health after floods.	Linguistic Conventions	Duplication	Major
Çukur alanlarda, binaların bodrum katlarına su basma tehlikesi yüksek olduğundan, bu türlü yerlerde bodrum yapılmamalı, <u>su basman</u> <u>kotu</u> yüksek tutulmalıdır.	Since there is a high risk of flooding in the basements of buildings in hollow areas, basements should not be built in such places and the <u>flood level</u> <u>should be kept high</u> .	Terminology	Wrong term	Major
Yerden destek olarak <u>yüzme hareketi ile</u> çıkış yüzeyinde kalmaya çalışılmalıdır.	One should try to stay on the avalanche surface <u>by swimming</u> with support from the ground.	Accuracy	Undertranslation	Minor
Dik yarıların yakınına, dik boğaz ve vadilerin içine bina yapılmamalıdır.	Buildings should not be built near steep cliffs, steep gorges and valleys.	Accuracy	Undertranslation	Minor
DEPREM ANINDA YAPILMASI GEREKENLER	<u>THINGS TO DO DURING AN EARTHQUAKE</u>	Accuracy	Undertranslation	Minor
Mutfak, imalathane, laboratuvar gibi iş aletlerinin bulunduğu yerlerde; ocak, fırın ve bu gibi cihazlar kapatılmalı, <u>dökülebilecek malzeme</u> ve maddelerden uzaklaştırılmalıdır.	In places where work equipment is located, such as kitchens, workshops and laboratories; Stoves, ovens and similar devices should be turned off and <u>spilled materials</u> and substances should be avoided.	Accuracy	Undertranslation	Minor
Bulunduğunuz yer	If your location is safe;	Accuracy	Mistranslation	Minor

güvenli ise; yolu kapatmadan <u>sağa yanaş</u> ıp durulmalıdır.	You should <u>turn right</u> and stop without blocking the road.			
DEPREM SONRASINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO</u> AFTER AN EARTHQUAKE	Accuracy	Undertranslation	Minor
Yerinden oynayan telefon ahizelerini <u>telefonun üstüne</u> koyun.	Place the mobile phone handsets on top of <u>the phone</u> .	Accuracy	Overtranslatiton	Minor
<u>Organizasyon bakımından</u> yangından korunma:	Fire protection <u>in terms of organization</u> :	Accuracy	Mistranslation	Minor
YANGIN ANINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO</u> IN CASE OF FIRE	Accuracy	Undertranslation	Minor
SEL SIRASINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO</u> DURING A FLOOD	Accuracy	Undertranslation	Minor
Araçta herhangi bir arıza oluştuysa hemen terk edilerek <u>yüksek bir yere</u> çıkılmalıdır.	If there is any malfunction in the vehicle, it should be abandoned immediately and <u>moved to a higher place</u> .	Accuracy	Mistranslation	Minor
SEL SONRASINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO</u> AFTER A FLOOD	Accuracy	Undertranslation	Minor
Bu nedenle evde gaz sızıntısı, <u>suyun altında kalmış elektrik aksamı, fırın, ocak ve elektrikle çalışan eşyaların</u> olmadığına emin olun.	For this reason, make sure that there are no gas leaks, <u>electrical parts submerged under water, ovens, stoves and electrical items at home</u> .	Accuracy	Undertranslation	Minor
Sel sırasında evinizde kalmış yiyecekler varsa bunları <u>kesinlikle kullanmayın</u> . (Konservelerde dahil)	If there is any food left in your home during the flood, <u>do not use it</u> . (Including canned goods)	Accuracy	Undertranslation	Minor
HEYELAN ANINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO</u> IN THE EVENT OF A LANDSLIDE	Accuracy	Undertranslation	Minor

Tehlike anında heyelan veya çamur akıntısının yolundan uzak durarak <u>hemen mümkün olduğu kadar yükseklerle doğru uzaklaşın</u> ve çevrenizde yaşayan insanları toprak kaymasına karşı uyarın.	In case of danger, stay away from the path of the landslide or mudflow, <u>move as high as possible</u> and warn the people living around you about the landslide.	Accuracy	Undertranslation	Minor
HEYELAN SONRASINDA <u>YAPILMASI GEREKENLER</u>	<u>THINGS TO DO AFTER LANDSLIDE</u>	Accuracy	Undertranslation	Minor
Güvenli bir yer bulup, diz üstü ÇÖK Başını ve enseni koruyacak şekilde KAPAN Düşmemek için sabit bir yere TUTUN	Find a safe place and <u>get on your knees.</u> CLOSE to protect your head and neck. HOLD on to a stable place to avoid falling.	Accuracy	Undertranslation	Neutral
Kıyafetiniz alev almışsa; <u>koşmadan</u> durup yere yatarak yuvarlanılmalıdır.	If your clothing caught fire; <u>Before running,</u> you should stop and lie down on the ground and roll.	Accuracy	Undertranslation	Neutral
Yerel yönetimler dere yataklarına yerleşim <u>yapılmaması konusunda</u> titizlik göstermeli, buralarda yerleşimin önlemelidir.	Local governments should be careful <u>not to settle in</u> stream beds and prevent settlement there.	Accuracy	Undertranslation	Neutral
<u>DEPREM ÖNCESİ</u> ALINACAK <u>ÖNLEMLER</u>	PRECAUTIONS TO BE TAKEN BEFORE <u>THE EARTHQUAKE</u>	Linguistic Conventions	Grammar – Function words	Minor
<u>DEPREM ANINDA</u> <u>BİNA</u> <u>İÇERİSİNDEYSENİZ;</u>	IF YOU ARE IN <u>THE BUILDING</u> DURING <u>THE EARTHQUAKE;</u>	Linguistic Conventions	Grammar - Function words	Minor
Sarsıntı sırasında bir tünelin içinde iseniz ve çıkışa yakın değilseniz; <u>araç durdurulup aşağıya inilmeli ve yanına yan yatarak ayaklar karına</u>	If you are in a tunnel during an earthquake and are not close to the exit; <u>The vehicle should be stopped, get down and lie on its side, feet drawn to</u>	Linguistic Conventions	Textual Conventions – Cohesion	Minor

<u>çekilip, ellerle baş ve boyun korunmalıdır.</u> (ÇÖK-KAPAN-TUTUN)	<u>the abdomen, and protect the head and neck with the hands.</u> (DOWN-COVER-HOLD)			
Her türlü işyerinde yangın söndürme tüpü bulundurulmalı, <u>düzenli bakımları yaptırılmalı ve nasıl kullanılacağı öğrenilmelidir.</u>	A fire extinguisher should be kept in every workplace, <u>regular maintenance should be done and how to use it should be learned.</u>	Linguistic Conventions	Grammar - Function words	Minor
Konutlarda da yangın söndürme tüpü bulundurulmalı, düzenli bakımları yaptırılmalı ve <u>nasıl kullanılacağı öğrenilmelidir.</u>	Fire extinguishers should be kept in residences, they should be regularly maintained and <u>they should be learned how to use them.</u>	Linguistic Conventions	Textual Conventions – Cohesion	Minor
Havayı <u>kesme</u> :	<u>Cut off air:</u>	Linguistic Conventions	Grammar – word form	Minor
<u>Süpür</u>	<u>sweep</u>	Linguistic Conventions	Spelling – Capitalization	Minor
Dumandan boğulmamak için yardım gelene kadar eğilerek ve sürünerek hareket edilmeli, <u>ağız ve burun ıslak bez ya da mendille kapatılarak nefes alınmalıdır,</u>	In order not to suffocate from the smoke, bend and crawl until help arrives, <u>cover your mouth and nose with a wet cloth or tissue, and breathe.</u>	Linguistic Conventions	Grammar - Word order	Minor
Atık sistemlerinin kullanıldığı ve <u>yerleşimin geliştiği</u> tepelik alanlar	Hilly areas where waste systems are used and <u>settlements develop</u>	Linguistic Conventions	Grammar - Word form	Minor
Kolayca ulaşılabilir bir yerde tutulmalıdır.	<u>It</u> should be kept in an easily accessible place.	Linguistic Conventions	Textual Conventions- Cohesion	Neutral
Yeri herkes tarafından bilinmelidir.	<u>Its</u> location should be known to everyone.	Linguistic Conventions	Textual Conventions- Cohesion	Neutral
Duvara sıkıca sabitlenmelidir.	<u>It</u> must be fixed firmly to the wall.	Linguistic Conventions	Textual Conventions- Cohesion	Neutral
Her yıl ilgili firma	<u>It</u> must be maintained by	Linguistic	Textual	Neutral

tarafından bakımı yapılmalıdır.	the relevant company every year.	Conventions	Conventions-Cohesion	
Bir kez kullanıldıktan sonra mutlaka tekrar doldurulmalıdır.	Once used, <u>it</u> must be refilled.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Kolayca ulaşılabilir bir yerde tutulmalıdır.	<u>It</u> should be kept in an easily accessible place.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Yeri herkes tarafından bilinmelidir.	<u>Its</u> location should be known to everyone.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Duvara sıkıca sabitlenmelidir.	<u>It</u> must be fixed firmly to the wall.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Her yıl ilgili firma tarafından bakımı yapılmalıdır.	<u>It</u> must be maintained by the relevant company every year.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Bir kez kullanıldıktan sonra mutlaka tekrar doldurulmalıdır.	Once used, <u>it</u> must be refilled.	Linguistic Conventions	Textual Conventions-Cohesion	Neutral
Ağız sıkıca kapatılmalı, hava kesesi oluşturmaya çalışılmalıdır, bu arada baş sağa sola doğru çevrilmeye çalışılmalıdır.	<u>The mouth should be closed tightly, an attempt should be made to create an air sac, while the head should be turned left and right.</u>	Style	Awkward	Minor
Akış esnasında oturma pozisyonu almaya çalışılarak (eller ve bacaklar bitişik) çığ durmadan önce bacaklar ile yer sertçe itilip (eğer zemin altta veya zemindeki kar setleşmeye başlamış ise) kalkılmaya çalışılmalıdır.	<u>During the flow, one should try to take a sitting position (hands and legs together) and try to get up by pushing the ground hard with the legs (if the ground below or the snow on the ground has started to harden) before the avalanche stops.</u>	Style	Awkward	Minor
Bu önlemlerin yanı sıra, yapısal olamayan, yani binadan değil de eşyalardan	<u>In addition to these precautions, we should take the following precautions when placing</u>	Style	Awkward	Minor

<u>kaynaklanacak</u> <u>hasarlardan korunmak</u> <u>için günlük</u> <u>kullandığımız</u> <u>eşyalarımızın ev</u> <u>içerisine</u> <u>yerleştirilmesinde</u> <u>aşağıda sayılan</u> <u>önlemleri almalıyız:</u>	<u>our daily used items in the</u> <u>house in order to be</u> <u>protected from non-</u> <u>structural damage, that is,</u> <u>damage caused by items</u> <u>rather than the building:</u>			
<u>Diğer güvenlik</u> <u>önlemleri alınarak</u> <u>gerekli olan eşya ve</u> <u>malzemeler alınarak</u> <u>bina daha önce tespit</u> <u>edilen yoldan derhal</u> <u>terk edilip toplanma</u> <u>bölgesine gidilmelidir.</u>	<u>Other security measures</u> <u>should be taken and the</u> <u>necessary items and</u> <u>materials should be taken,</u> <u>the building should be</u> <u>immediately left via the</u> <u>previously determined</u> <u>path and the assembly area</u> <u>should be reached.</u>	Style	Awkward	Minor
<u>Kontak anahtarı yerinde</u> <u>bırakılıp, pencereler</u> <u>kapalı olarak araç</u> <u>içerisinde beklenmelidir.</u>	<u>The ignition key should be</u> <u>left in place and the</u> <u>vehicle should be waited</u> <u>in with the windows</u> <u>closed.</u>	Style	Unidiomatic	Minor
<u>Artçı depremler hasarlı</u> <u>binalarda zarara yol</u> <u>açabilir.</u>	<u>Aftershocks may cause</u> <u>damage to damaged</u> <u>buildings.</u>	Style	Awkward	Minor
<u>Organizasyon</u> <u>bakımından yangından</u> <u>korunma:</u>	<u>Fire protection in terms of</u> <u>organization:</u>	Style	Unidiomatic	Minor
<u>Özellikle kapalı yerlerde</u> <u>oluşan yangınlara</u> <u>uygulanır.</u>	<u>It is especially applied to</u> <u>fires that occur in closed</u> <u>places.</u>	Style	Unidiomatic	Minor
<u>Telaşa kapılmadan</u> <u>çevrede yangın ihbar</u> <u>düğmesi varsa ona</u> <u>basılmalıdır,</u>	<u>If there is a fire alarm</u> <u>button nearby, you should</u> <u>press it without getting</u> <u>alarmed.</u>	Style	Unidiomatic	Minor
<u>Şehir içlerinde yeterince</u> <u>yağmur suyu kanalı</u> <u>olmalı ve bunların</u> <u>sürekli bakımları</u> <u>yapılmalıdır.</u>	<u>There should be enough</u> <u>rainwater channels in the</u> <u>cities and their constant</u> <u>maintenance should be</u> <u>done.</u>	Style	Unidiomatic	Minor

Elektrik kaynaklarından uzak durulmalıdır, <u>elektrik çarpabilir!...</u>	You should stay away from electrical sources, <u>you may get an electric shock!...</u>	Style	Unidiomatic	Minor
<u>Heyelan</u> açısından <u>sorunlu alanlarla</u> ilgili olarak yer bilimcilere ve mühendislere danışmak,	Consult with geoscientists and engineers regarding <u>landslide problem areas</u> ,	Style	Unidiomatic	Minor
Su ile Soğutma: Yanıcı maddeyi boğma ve yanıcı maddeden ısı alarak yangının söndürülmesinde en büyük etken olmaktadır.	Cooling with Water: <u>It is the biggest factor in extinguishing the fire by suffocating</u> the flammable material and taking heat from the flammable material.	Style	Awkward	Neutral
Kasıtlı <u>çıkarılan</u> orman yangınları:	Deliberately <u>started</u> forest fires:	Style	Unidiomatic	Neutral
Diğer insanlar uyarılmalıdır. (ses, ısıklık, <u>düdük</u> , korna, vb.)	Other people should be warned. (voice, whistle, <u>whistle</u> , horn, etc.)	Terminology	Wrong term	Minor
Kaygan ve <u>ovalık</u> bölgeler iskana açılmamalıdır.	Slippery and <u>plain</u> areas should not be opened to settlement.	Terminology	Wrong term	Minor
Soba ve diğer ısıtıcılar sağlam malzemelerle duvara veya yere <u>sabitlenmelidir</u> .	Stoves and other heaters should be <u>fixed</u> to the wall or floor with sturdy materials.	Terminology	Wrong term	Minor
Dolaplar ve devrilebilecek benzeri eşyaları birbirine ve duvara <u>sabitlenmelidir</u> .	Cabinets and similar items that may tip over should be <u>fixed</u> to each other and to the wall.	Terminology	Wrong term	Minor
<u>Sabitlenmemiş</u> dolap, raf, pencere vb. eşyalardan uzak durulmalıdır.	<u>Unfixed</u> cabinets, shelves, windows, etc. items should be avoided.	Terminology	Wrong term	Minor
<u>Sarsıntı</u> durduktan sonra açık alanlara gidilmelidir.	After the <u>shaking</u> stops, you should go to open areas.	Terminology	Wrong term	Minor
<u>Kapalı</u> bir otoparkta iseniz; araç dışına çıkılıp, yanına yan	If you are in a <u>closed parking lot</u> ; You should get out of the vehicle and	Terminology	Wrong term	Minor

yatarak, ellerle baş ve boyun korunmalıdır.	lie on your side, protecting your head and neck with your hands.			
<u>Sarsıntı</u> bitinceye kadar metro ya da trenin içinde, sıkıca tutturulmuş askı, korkuluk veya herhangi bir <u>yere</u> tutunmalı, metro veya tren personeli tarafından verilen talimatlara uyulmalıdır.	You should hold on to a tightly attached hanger, railing or any other <u>place</u> inside the subway or train until the <u>shaking</u> ends, and follow the instructions given by the subway or train personnel.	Terminology	Wrong term	Minor
<u>KAPALI ALANDAYSANIZ;</u>	IF YOU ARE IN A <u>CLOSED AREA;</u>	Terminology	Wrong term	Minor
<u>Cadde ve sokakların</u> acil yardım araçları için boş bırakın.	Leave <u>streets and streets</u> clear for emergency vehicles.	Terminology	Wrong term	Minor
Sonra <u>mahalle toplanma noktanıza</u> gidin.	Then go to your <u>neighborhood gathering point.</u>	Terminology	Inconsistent use of terminology	Minor
Su: Ateşi söndüren <u>maddeler</u> arasında en önemlisi sudur.	Water: Among the <u>substances</u> that extinguish fire, water is the most important.	Terminology	Inconsistent use of terminology	Minor
Kum: Yanıcı maddelerin oksijenle <u>ilişkisinin</u> kesilerek söndürülmesinde kullanılır.	Sand: It is used to extinguish flammable materials by cutting off their <u>connection</u> with oxygen.	Terminology	Wrong term	Minor
<u>YANGIN SÖNDÜRME TÜPLERİ;</u>	<u>FIRE EXTINGUISHING EXTINGUISHERS;</u>	Terminology	Wrong term	Minor
<u>YANGIN SÖNDÜRME TÜPLERİNİN KULLANIMI;</u>	USE OF <u>FIRE EXTINGUISHING EXTINGUISHERS;</u>	Terminology	Wrong term	Minor
Yangın <u>kapalı</u> alandaysa yayılmasını önlemek için kapı ve pencereler kapatılmalıdır,	If the fire is in a <u>closed area</u> , doors and windows should be closed to prevent its spread.	Terminology	Wrong term	Minor
Yabani hayvanları uzaklaştırmak için	<u>Setting fires</u> to drive away wild animals.	Terminology	Inconsistent use of terminology	Minor

<u>yangın çıkarılması.</u>				
Sel tehlikesi bulunan <u>eğimli yamaçlarda</u> teraslama ve ağaçlandırma yapılmalıdır.	Terracing and afforestation should be done on <u>sloping slopes</u> that are at risk of flooding.	Terminology	Wrong term	Minor
Bazı durumlarda bütün kapıları açarak suyun binanın içinden akmasına izin vermek çok daha iyidir; böylece su basıncının <u>yapının taşıyıcı sistemine</u> zarar vermesi önlenir.	In some cases it is much better to open all the doors and let the water flow through the building; Thus, water pressure can be prevented from damaging the <u>structural system of the structure</u> .	Terminology	Wrong term	Minor
<u>Su yatağı</u> ve çukur bölgeler hemen terk edilmelidir.	<u>Water beds</u> and pit areas should be abandoned immediately	Terminology	Wrong term	Minor
<u>Konutu terk ederken</u> elektrik ve su vanaları kapatılmalıdır.	Electricity and water valves should be turned off <u>when leaving the house</u> .	Terminology	Wrong term	Minor
Eski dolguların üst ve <u>topuk kesimleri</u>	Upper and <u>heel cuts</u> of old fillings	Terminology	Wrong term	Minor
<u>Yamaç eğiminde</u> ani değişimlerin gözlenmediği nispeten düşük eğimli araziler	Lands with relatively low slopes where sudden changes in <u>slope slope</u> are not observed	Terminology	Wrong term	Minor
Heyelandan etkilenebilecek <u>çevre</u> bilgilendirilmelidir.	<u>The environment</u> that may be affected by the landslide should be informed.	Terminology	Wrong term	Minor
<u>KAPALI ALANDAYSANIZ;</u>	IF YOU ARE IN <u>A CLOSED AREA;</u>	Terminology	Wrong term	Minor
Çevrenizde yaralı veya <u>yardıma muhtaç kişiler</u> varsa, yangın ve yeni bir heyelan gibi bir tehlike yoksa onları yerlerinden oynatmayın.	If there are injured or <u>needy people</u> around you, do not move them unless there is a danger such as fire or a new landslide.	Terminology	Wrong term	Minor
<u>Cadde ve sokakların</u> acil yardım araçları için boş	Leave <u>streets and streets</u> clear for emergency	Terminology	Wrong term	Minor

bırakın.	vehicles.			
Yerleşim alanlarında yeteri kadar <u>verbilimleri</u> ve mühendislik araştırmaları yapılmalıdır.	Adequate <u>earth science</u> and engineering research should be carried out in residential areas.	Terminology	Wrong term	Minor
Orman içinde yapılan kanunsuz işleri gizlemek için <u>yangın çıkarılması</u> ,	<u>Setting fires</u> to hide illegal activities in the forest,	Terminology	Inconsistent use of terminology	Minor
Tüm bireylerin katılımı ile (evde, iş yerinde, <u>apartmanda</u> , okulda) “Afete hazırlık planları” yapılmalı, her altı ayda bir bu plan gözden geçirilmelidir.	“Disaster preparedness plans” should be made with the participation of all individuals (at home, at work, <u>in an apartment</u> , at school), and this plan should be reviewed every six months.	Terminology	Wrong term	Neutral
Zaman zaman bu plana göre nasıl davranılması gerektiğinin <u>tatbikatları</u> yapılmalıdır.	<u>Exercises</u> on how to act according to this plan should be carried out from time to time.	Terminology	Wrong term	Neutral
Yangının yayılmasını önlemek amacıyla, <u>yangın bölümleri</u> oluşturulmalıdır,	In order to prevent the spread of fire, <u>fire sections</u> should be created,	Terminology	Wrong term	Neutral
<u>YANGIN SÖNDÜRMEDE KULLANILAN YÖNTEMLER</u>	<u>METHODS USED IN FIRE FIGHTING</u>	Terminology	Wrong term	Neutral

Appendix K – TYPOLOGY OF PRE-EDITING OPERATIONS

Edit Operation	Description and Examples	
Change of passive voice to active	Altering sentences from passive voice construction to active voice construction	
Example:	Konutlarda da yangın söndürme tüpü <u>bulundurulmalı</u> , düzenli bakımları <u>yaptırılmalı</u> ve nasıl kullanılacağı <u>öğrenilmelidir</u> .	→ Konutlarda da yangın söndürme tüpü <u>bulundurun</u> , düzenli bakımlarını <u>yaptırın</u> ve nasıl kullanılacağını <u>öğrenin</u> .
	Kırılmış ağaç ve kaya parçalarından korunmaya <u>çalışılmalıdır</u> .	→ Kırılmış ağaç ve kaya parçalarından korunmaya <u>çalışın</u> .
Sentence reordering	Rearrangement of the order of the words, phrases, or clauses	
Example:	Tavan ve duvara asılan avize, klima vb. cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağa ve kanca ile asılmalıdır.	→ <u>Avize, klima ve benzeri tavana veya duvara asılabilen cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde</u> duvar ve pencerelerden yeterince uzağa ve kanca ile asılmalıdır.
	Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa <u>ÇÖK-KAPAN-TUTUN hareketi ile başınızı ve boynunuzu koruyun</u> .	→ Çamur ve moloz akmasından kaçabilecek zamanınız veya etrafınızda arkasına saklanacağınız sağlam bir yapı yoksa, <u>başınızı ve boynunuzu korumak için yere çökün, kapanın, ve tutun.</u>
Spelling normalization	Correcting spelling errors, typos, and fixing deviations from standard spelling conventions	
Example:	Sağlam eşyaların altında <u>ve ya</u> yanında hayat üçgeni oluşturarak <u>ÇÖK-KAPAN-TUTUN</u> hareketini uygulayın.	→ Sağlam eşyaların altında <u>veya</u> yanında hayat üçgeni oluşturarak <u>çök, kapan ve tutun</u> hareketini uygulayın.
	Cadde ve <u>sokakların</u> acil yardım araçları için boş bırakın.	→ Cadde ve <u>sokakları</u> acil yardım araçları için boş

			bırakın.
Semantic clarification	Making the information more straightforward by resolving ambiguity, rephrasing unclear expressions, and inserting additional information to enhance the semantic connection between words		
Example:	Artçı depremler hasarlı binalarda zarara yol açabilir.	→	Artçı depremler hasarlı binalarda <u>daha fazla zarara</u> yol açabilir.
	Sık	→	<u>Tetiği</u> sık
Use of alternative infinitive suffix	Substituting the Turkish -me suffix at the end of a verb with its alternative -mek, and vice versa		
Example:	Havayı <u>kesme</u>	→	Havayı <u>kesmek</u>
	Soğutarak <u>Söndürme</u>	→	Soğutarak <u>Söndürmek</u>
Conversion of verbal adverbs to imperative	Changing the adverbial verb to its base form and inserting the imperative suffix or omitting the infinitive suffix		
Example:	Sağlam eşyaların altında ve ya yanında <u>hayat üçgeni oluşturarak</u> ÇÖK-KAPAN-TUTUN hareketini uygulayın.	→	Sağlam eşyaların altında veya yanında <u>hayat üçgeni oluşturun</u> ve yere çökün, kapanın, ve tutunun.
	Tekerlekli sandalyede isek <u>tekerlekler kilitlenerek</u> baş ve boyun korumaya alınmalıdır.	→	Tekerlekli sandalyede iseniz <u>tekerlekleri kilitleyin</u> ve başınızı ve boynunuzu korumaya alın.
Use of alternative imperative form	Changing the imperative verb to different, more polite forms by appending the -in/-ın/-un/-ün etc. suffix according to vowel harmony rules in Turkish		
Example:	Koridordaysanız duvarın yanına hayat üçgeni oluşturacak şekilde <u>çök, kapan, tutun.</u>	→	Koridordaysanız duvarın yanına hayat üçgeni oluşturacak şekilde <u>çökün, kapanın, tutunun.</u>
	Çamur ve moloz akmasından kaçabilecek zaman yoksa yere <u>çök, kapan, tutun.</u>	→	Çamur ve moloz akmasından kaçabilecek zaman yoksa yere <u>çökün, kapanın, tutunun.</u>
Use/disuse of punctuation	Removing, replacing or inserting punctuation		
Example:	Bulunduğunuz yer güvenli <u>ise</u> ; yolu kapatmadan sağa yanaşıp durulmalıdır.	→	Bulunduğunuz yer güvenli <u>ise</u> , yolu kapatmadan sağa yanaşıp durulmalıdır.
	Çığa <u>yakalanırsanız!</u>	→	Çığa <u>yakalanırsanız:</u>

Insertion of possessive suffix	Inserting the appropriate possessive suffix to a noun or pronoun according to the grammar and vowel harmony rules in Turkish	
Example:	<u>Ağız</u> sıkıca kapatılmalı, hava kesesi oluşturmaya çalışılmalıdır, bu arada <u>baş</u> sağa sola doğru çevrilmeye çalışılmalıdır. <u>Eşya</u> almak için zarar görmüş binalara girmeyin.	<u>Ağzınızı</u> sıkıca kapatın, hava kesesi oluşturmaya çalışın, bu arada <u>başınızı</u> sağa sola doğru çevirmeye çalışın. <u>Eşyalarınızı</u> almak için zarar görmüş binalara girmeyin.
Alternative lexical choice	Substituting a word with a synonym or using an alternative expression for a phrase	
Example:	Sel sırasında evinizde kalmış yiyecekler varsa bunları <u>kesinlikle</u> kullanmayın. Battaniye <u>türü</u> örtüler alınarak alevler boğulmaya çalışılmalıdır.	Sel sırasında evinizde kalmış yiyecekler varsa bunları <u>asla</u> kullanmayın. Battaniye <u>benzeri</u> örtüler alınarak alevler boğulmaya çalışılmalıdır.
Lexical simplification	Making a sentence more concise by removing redundant expressions	
Example:	<u>Şehir içlerinde</u> yeterince yağmur suyu kanalı olmalı ve bunların sürekli bakımları yapılmalıdır. Yerinden oynayan telefon ahizelerini <u>telefonun üstüne</u> koyun.	<u>Şehirlerde</u> yeterince yağmur suyu kanalı olmalı ve bunların sürekli bakımları yapılmalıdır. Yerinden oynayan telefon ahizelerini <u>yerlerine</u> koyun.
Insertion of article	Inserting the Turkish indefinite article “bir” before a noun	
Example:	<u>Deprem</u> öncesi alınacak önlemler <u>Kapalı alandaysanız</u>	<u>Bir deprem</u> öncesi alınacak önlemler <u>Kapalı bir alandaysanız</u>
Pluralization of nominal noun	Changing the nominal noun to a plural by appending the appropriate plural suffix	
Example:	<u>Tavan arası</u> ve bodrumlar temiz tutulmalıdır	<u>Tavan araları</u> ve bodrumlar temiz tutulmalıdır
Disuse of “vb.” abbreviation	Expanding the abbreviation “vb.” to its full form “ve benzeri”	
Example:	Tavan ve duvara asılan avize, klima <u>vb.</u> cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve pencerelerden yeterince uzağa ve kanca ile	Tavan ve duvara asılan avize, klima <u>ve benzeri</u> cihazlar bulundukları yere ağırlıklarını taşıyacak şekilde duvar ve

	asılmalıdır.	pencerelerden yeterince uzağa ve kanca ile asılmalıdır.
	Konutların duvarlarında, katlardaki zeminlerde ve pencerelerdeki hasarlar, tavan, sıva <u>vb.</u> malzemelerin dökülmesi riskinin olup olmadığı kontrol edilmelidir.	Konutların duvarlarında, katlardaki zeminlerde ve pencerelerdeki hasarlar, tavan, sıva <u>ve benzeri</u> malzemelerin dökülmesi riskinin olup olmadığı kontrol edilmelidir.
Sentence restructuring	Modifying the wording of a sentence by paraphrasing	
Example:	Deprem anında yapılması gerekenler →	Deprem anında ne yapılmalı?
	Sel sırasında yapılması gerekenler →	Sel sırasında ne yapılmalı?
Unable to fix	Instances where no pre-editing effort was sufficient to fix the error present in the machine translation output	

ÖZGEÇMİŞ

Adı, Soyadı	Mehmet Kaan	SEYRATLI	
Doğum Yeri ve Yılı			
Bildiği Yabancı Diller	İngilizce	Almanca	
ve Düzeyi	İleri	Orta	
Eğitim Durumu	Başlama - Bitirme Yılı	Kurum Adı	
Lise	2010	2014	Güneşli Final Okulları
Lisans	2014	2019	İstanbul Arel Üniversitesi
Yüksek Lisans	2020	2024	İstanbul 29 Mayıs Üniversitesi
Doktora			
Çalıştığı Kurum/lar	Başlama - Ayrılma Yılı	Çalışılan Kurumun Adı	
1.			
2.			
3.			
Üye Olduğu Bilimsel ve Mesleki Kuruluşlar			
Katıldığı Proje ve Toplantılar			
Yayınlar:			
Diğer:			
İletişim (e-posta):			
Tarih		07/05/2022	
İmza			
Adı Soyadı		Mehmet Kaan SEYRATLI	

