Bilingual Technical-Translation Thesaurus as a Reliable Aid to Technical Communication

Maryam Faal Hamedanchi

Peoples' Friendship University of Russia

The present article reviews the problem of technical terminology translation and the role it plays in technical communication. Despite the progressing attempts for standardization of terminology, there is still long distance to a perfect terminology system practically in all language societies. For an individual concept are used different variants even within a single text and technical dictionaries often fail to cover all these variants. Languages do not possess the same instruments for illustrating a definite concept, as a result, in translating different equivalents of a single concept the translated terms may be considered as synonyms rather than variants or, on the contrary, partial synonyms of a term in the source language can be considered as variants or close synonyms in the target one. The problem gets even more complicated when it comes to languages, namely Persian and Russian, where the users are imposed to employ English as an intermediate language.

Technical dictionaries pay less attention to these differences, at the best, they may provide scope notes or short definitions to distinguish different senses of a term, which hardly suffices for a proper communication. On the other hand, users of a bilingual technical dictionary may look up different kinds of information besides definition and equivalents. They may look up cross-language synonymous or antonymous, allocations, homonyms and other information, which are rarely provided by a bilingual technical dictionary.

These facts imply the necessity of employing more onomasiological approach in compiling bilingual technical dictionaries. In our opinion, a revised structure of information-retrieval thesauri complies in a better way with the requirements of technical dictionaries.

A technical-translation thesaurus can reveal the basic structure of an information retrieval thesaurus, but compiles the necessary features of a common language thesaurus and provide approaches to equivalents of a term in different languages starting from the concept, which does not depend on the language.

1. Introduction

Technical dictionaries play a pivotal role in international scientific and technological communication activities. Dictionaries and glossaries of technical terms may be mono- and multilingual, with international standards organizations seeking to establish equivalence of standardized terms and concepts across languages. On the other hand, terminological databases and databanks have been, from the early seventies (Eurodicautom, 1973), one of the most important and reliable sources of information for many professional groups dealing with specialized lexical information (translators, technical writers, lexicographers, information scientists) (Tebé, 2008: 375). Still, standardization of terminology seems to achieve less prosperity in terms of narrowing the processes of term formation. Authors of technical texts intend to use different variants for an individual concept even within a single text, and technical dictionaries often fail to cover all these variants. Besides, term formation process in receptor languages, (i.e. languages, which receive new terms through translation of foreign terms), is impressed by various factors, including translation methods, semantic and syntactic rules of the target language, which in its turn, motivates the formation of nominative variations across languages. Hence, technical terminology reveals more complicated structure, than it is normally believed to be. The problem gets even more complex when it comes to communication between two receptor languages, namely Persian and Russian, where English acts as an intermediate. Technical dictionaries are expected to ensure a safe multilingual communication between languages, but they fail to do so, due to their own shortcomings. Besides, in countries with less standardized terminology like Iran, most efforts for compiling bilingual technical dictionaries are made by branch specialists and technical people. As a result, the products mainly resemble glossaries of technical terms rather than linguistic outputs, which consequently hinder a proper international communication in the field of

science and technology. This paper will briefly attempt to review the problems of technical translation and discuss a proper structure for technical dictionary as an aid to technical communication.

2. Technical Terminology and Shortcomings of Technical Dictionaries

Scientific and technical communication requires a precise and strict language. Even a single word misused, may prevent the message to be transferred properly. The need for specialised communication leads to terms being regulated more specifically than other words, often in the form of standardization, but many other forms too, suggesting that terms undergo different forms of legitimisation (Humbley 2009). Hence, due to a huge number of international terms, borrowings, neologisms, calques and polysemies, the semantic system is much complicated in terms of technical languages. For instance, denominative variation is so common for special terms, even the name given to the phenomenon shows considerable variation in most languages. Language contact motivates an increase in variants as languages try to respond to the need of naming new concepts taken over from other languages swiftly and with different attitudes to the creation of terms (Freixa 2006). Technical dictionaries always try to provide most common variations of terms and usually titled them as absolute synonyms. As a result, bi- and multilingual dictionaries confront with a massive volume of variants in both source and target languages.

Providing the exact equivalents of a term in the other language is not so easy task. Languages do not possess the same instruments for illustrating a definite concept, as a result, different equivalents of a single concept in another language may be considered as synonyms (possibly stylistic synonyms) rather than variants. The problem will get more complicated when it comes to languages, namely Persian and Russian, where the users are imposed to employ English as an intermediate language, since there is no reliable Russian-Persian technical dictionary. Take, for example, the Russian term (1) *попутный газ*, for which Russian-English Multitran dictionary gives at least four English variants, in the oil and gas field. 'попутный газ': (2) *associated gas* (получаемый из коллектора нефти[1]); (3) *casing head gas*; (4) *casinghead gas;* (5) *associated dissolved gas;* (6) *Braden head gas* (получаемый из коллектора нефти[2]); (7) *casing-head gas* (получаемый из коллектора нефти или выделяющийся из скважины[3]); (8) *CHG*(casing head gas); (9) *oil-well gas* (из коллектора нефти или из нефтяной скважины[4]); (10) *trip gas* (поступающий в скважину в процессе подъёма и спуска бурильной колонны[5]); (11) *well head gas*. Scope notes have been given for some terms, but they seem less helpful, as they are too general. English-Persian Dictionary of Petroleum Science & Technology gives these equivalents for each English variant. (12) 'associated gas': *gaz-e hamrah-e naft*[6]; *gaz-e darun nafti*[7]; *gaz-e hal shodeh*[8]. (13) 'casing

---

[1] derived from the oil collector.

[2] derived from the oil collector.

[3] derived from the oil collector or oil well.

[4] derived from the oil collector or oil well.

[5] entering the well, while lifting and lowering the drillstem (literally translation).

[6] associated gas.

[7] gas within the oil (literally translation).

gas': *gaz-e jedarei*[9]; *gaz-e lule-ye jedareh*[10]. (14) 'dissolved gas': *gaz-e mahlul*[11]; *gaz-e hal shodeh*[12]. (15) 'trip gas': *gaz-e az chah birun keshideh shodeh*[13]. At the first glance, all the terms may look equivalents, which refer to a single concept from different view points.

Compare the definitions of the terms in Prodigy Oil and Gas Dictionary. *Associated Gas* – 'gas that occurs with oil, either as free gas or in solution. Gas occurring alone in a reservoir is unassociated gas'; *Solution Gas-*'dissolved gas in wellbore or reservoir fluids. The gas will remain in solution until the pressure or temperature conditions change, at which time it may break out of solution to become free gas'*; Dissolved Gas-* 'natural gas which is in solution with crude oil in the reservoir'*; Casinghead Gas-*'(oil well gas) is associated and dissolved gas produced along with crude oil from oil completions'*; Trip Gas-* ' gas that enters the wellbore when the mud pump is shut down and pipe is being pulled from the wellbore. The gas may enter because of the reduction in bottomhole pressure when the pump is shut down, because of swabbing, or because of both'.

As it is seen from the definitions, the first four variants partly refer to the same concept, however they cannot be considered as absolute synonyms. The fifth one indicates a totally different process. Reasonably, full equivalents may need mere listing, while partial and surrogate equivalents require further explanation or exemplification to ensure sense identification and discrimination, which mostly ignored by technical dictionaries. Bilingual technical dictionaries, at the best, may provide scope notes or short definitions to distinguish different senses or scopes of a term, which hardly suffice for a determination on the best equivalent.

Another example, which better illustrates the shortcoming of bi- and multilingual technical dictionaries, is the problem of 'international words' and so-called 'false-friends'. International scientific and technical terms seemingly ease the communication, while in some cases international terms reveal minute semantic differences in various languages, which may impede proper communication. For instance, (16) an *extrude* is 'an item (moulded sections of plastic, metal, etc.), produced by ejection under pressure through a suitably shaped nozzle or die', it may have different shape, based on the nozzle or the die. In English and Russian, when speaking about extrude catalyst, it means a catalyst crystal, which usually has a rolled or cylindrical shape, but it may have any other shape regarding the die. While in Persian, an extrude mainly takes for 'spaghetti shape'. So extrudes may have different shapes and consequently different production technology, which can hardly be illustrated by the term *extrude* in Persian. Multilingual dictionaries rarely illustrate these kinds of differences.

Ordinary words, adopted as technical terms to convey special meanings, may gain senses different from their everyday uses in some languages. For instance, in petroleum terminology,

---

[8] dissolved gas.

[9] wall gas'

[10] wall pipe gas.

[11] solution gas.

[12] dissolved gas.

[13] gas, which is extracted from the well (literally translation).

(17) *wet gas* can be 'natural gas that contains water' or 'natural gas that contains less methane and more complex hydrocarbons'. In Persian the first sense usually expressed by *gaz-e martub* 'wet gas', and the second sense by *gaz-e ghani* (18)'rich gas' or *gaz-e charb* (19)'fat gas'. Both terms are used as equivalents for *wet gas* in English as well. Russian, however provides more complicated system of equivalents, comprising: *жирный газ* 'fat gas'; *влажный газ* (20)'humid gas' or 'wet gas'; *конденсатный газ* (21)'condensate gas'; *неосушенный газ* 'undrained gas'; *неотбензиненный газ* (22)'nonstripped petroleum gas'. It means the term *wet gas* in Russian is more general than in Persian and Persian term *gaz-e martub* can hardly overlap all the meanings of *wet gas* in Russian.

Another example is (23) *sweet gas*. The antonym of *sweet gas* in English petroleum terminology is (24) *sour gas*, in Persian *gaz-e shirin* 'sweet gas' is opposite to *gaz-e torsh* 'sour gas', while in the Russian petroleum terminology the antonym of *сладкий газ* 'sweet gas' is *сернистый газ,* which means (25) 'sulphurous gas' and the term *кислый газ* 'sour gas' is mainly used in ecological contexts. As it is seen from the examples, when ordinary words are adopted as technical ones, they not only gain new senses, but may be affected in terms of the semantic system.

Ploysemies are not so rare in technical terms, and they may hinder a proper communication across languages. For instance, the Russian term *шлам* in oil and gas field is equivalent to two English terms, (26)'mud'(:the liquid circulated through the wellbore during rotary drilling and workover operations) and (27)'sludge' (:a thick, viscous emulsion containing oil, water, sediment and residue that forms because of the incompatibility of certain native crude oils and strong inorganic acids used in well treatments). Russian-English technical dictionaries usually give merely some scope notes, which rarely suffice here as the terms are used in so close fields. In Persian, however, each term has a unique equivalent, i.e. *gel* 'mud' and *lajan* 'sludge'.

Technical concepts are usually expressed by compound terms. Each element within a compound term carries a part of the concept, any change or elimination of elements may result in inducing another concept. For instance, (28) *water producing well* is 'a petroleum well drowned by water, while (29) *water well* is 'a well, which gives water'.

As we considered here, common technical dictionaries are mostly incapable to cover all features of technical terminology. The specific features which terms possess and which can be claimed to justify special treatment are all connected in some way with the cognitive dimension. (Humbley 2009).

Moreover, users of a bilingual technical dictionary may look up different kinds of information besides the definition and equivalents in other languages. They may look up cross-language synonymous or antonymous terms, allocations, homonyms and other information, which are rarely provided by a bilingual technical dictionary. To provide all these features, technical dictionaries must take a dialectic approach, combining semasiological with onomasiological principles. In our opinion, a revised structure of information-retrieval thesauri complies in a better way with the requirements of technical dictionaries.

3. Bilingual Technical-Translation Thesaurus as a Solution

A thesaurus is a semantic tool used for information retrieval, query expansion and indexing, among other purposes. It is basically a selection of the basic vocabulary in a domain

supplemented with information about synonyms, homonyms, generic terms, part/whole terms, 'associative terms' and other information. Multilingual thesauri typically consist of two or more monolingual thesauri cross-referenced by *concept* rather than alphabetically. By means of these links, a user can follow correspondences across multiple languages and rapidly browse an entry's subcategorizations of meanings and its synonyms.

Practically any multilingual retrieval thesaurus can be used as a translation thesaurus. However, an information-retrieval thesaurus fails to meet all requirements as a translation tool, due to application of controlled vocabulary and Information Retrieval Language. Besides, linguistic issues are noted very rarely in an information retrieval thesaurus.

A technical-translation thesaurus can reveal the basic structure of an information retrieval thesaurus, but compiles the necessary feature of a common language thesaurus. It tries to group terms together according to the subject concept. The internal form of individual entries and the arrangement of various entries in relation to one another constitute the structure of the thesaurus. Cross-references make explicit the way in which entries relate to each other in a network of concepts.

The most dominant feature of a thesaurus is the classification scheme. 'It has come to be self-evident that a classification scheme is an indispensable tool when compiling a thesaurus. When the editor is forced to work solely within an alphabetical list of numerous descriptors, at the level of the individual term, there is a sense of working 'blind'. In contrast, where a rigorous classification is developed, providing an overall picture of the subject area, the compiler has a better chance of building accurate and meaningful relationships between the terms' (Aitchison 2004: 10).

A thesaurus employs different lexicological approach to provide several accesses to a single concept or term. Thesaurus *Alphabetical Display*, with descriptors followed by their relationships and listed in alphabetical sequences provides all semantically related terms under one entry. To find the exact equivalent of each term in the other language, the user can follow an address code provided with each term. Scope notes and definitions are given where necessary. Unlike information-retrieval thesaurus, technical- translation thesaurus can and should give examples where needed.

In the *Classified Display*, the terms are listed in accordance with the hierarchical relationships represented in the thesaurus. In the technical-translation thesaurus, categories can be arranged both thematically and conceptually, to guide a user from a definite theme or concepts to the relevant terms in the same or other language.

The *Rotated Display* allows the user to find a multi-word term by looking for any of its component words. For instance, *Manufacturer's rated capacity* can be found by looking either for *Manufacturer*; *rated* or *capacity*.

In this way, a bilingual technical-translation thesaurus employs several semantic approaches to aid access to the required terms in each language. Users can reach the needed term starting from concepts, synonyms or antonyms in the same language or its equivalents in the other language. They also can find terms in different combinations and reach the required compound terms by searching each element.

Compiling a bilingual technical-translation thesaurus is a complicated task, requiring the cooperation of lexicographers, linguists and branch specialists. Bilingual thesauri are not so common even in information-retrieval case. Compiling terms with almost the same semantic relations from different languages is not an easy task and even impossible in some cases. Not all languages express the same concepts equally. Besides, it is always asserted that a thesaurus is not a dictionary, and it does not normally contain authoritative definitions of the terms, which it lists. While in our case, the thesaurus should play the roles of a bilingual dictionary and a thesaurus at the same time.

The other problem to mention is the space. Providing different approaches to a single term requires large space and accordingly the outcome would be too bulky to handle. In addition, it is in no way economical. So, bilingual technical-translation thesaurus inevitably has to be provided in an automated system. This in its turn calls for the cooperation of IT specialists.

References

Aitchison, J.; Clarke, S. D. (2004). *The thesaurus: A historical viewpoint, with a look to the future*. ed. by Sandra K. Roe & Alan R. Thomas. New York: Haworth Information Press.

English- Persian Dictionary of Petroleum Sciences and Technology. Teheran, Iran: Khosh-Ava Publishing House, 2005.

Freixa, J. (2006). 'Causes of denominative variation in terminology: A typology proposal'. In *Terminology* 12:1, 51–77.

Humbley J. (2009). 'Accounting for Term Formation'. *The Journal Terminology Science and Research*, on line: http://lipas.uwasa.fi/hut/svenska/iitf/publications.php.

Multitran System for Translators. http://www.multitran.ru/ [access date: 23 Jan 2010]

Oilfield Glossary. http://www.glossary.oilfield.slb.com/

Prodigy Oil and Gas online Dictionary: http://prodigyoilandgas.com [access date: 23 Jan 2010]

Tebé C.; Marco M.C. (2008) **'**Retrieving Terminological Information On The Net. Are Linguistic Tools Still Useful?' In *Proceedings of the tenth International ISKO Conference*, 5-8 August 2008, Montréal, Canada. 374-380.