

Compound Words in Arabic Mechanical Term

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ABSTRACT

The paper reports on the results of a study purposing to observe the compound words in Modern Arabic Standard (MSA) found in Dictionaries of Arabic *Mu'jam Handasat al-Mikanik al-Musowir* in the subject of lexicography at 4th semester in the Arabic Translation Department. This study is purposed to describe what the forms of compound words are and what the meaning is by using Yule's theory and Nick Riemer' theory. The criteria are used in this study are orthographic, phonological, syntactic and semantics in nature which to make the distinction between compounds and phrases. This study uses a descriptive qualitative view. The source of data is text or words. The subject in this study is Arabic forms of compound words. The data is collected by using the documentation method. There are several procedures to collect the data: reading the CNN Arabic newspaper, reading the dictionaries, selecting compound words, and retying. The data is analyzed by using tree diagram Plag's theory and identifying meaning using Nick Riemer's theory. The analysis reveals that the most reliable linguistics criteria: a) adjacency shows that no intervening elements can be inserted between the head and the non-head of compounds, b) referential reveals that insertion is allowed in the phrase. Based on the form of a compound word, there are noun compound, verb compound and conjunctive compound words.

Keywords: *mechanic, Arabic, form and meaning, compound words.*

1. INTRODUCTION

The development of Arabic vocabularies especially word compounds increases rapidly in the industrial era 4.0. It has known through the internet, social media, textbooks, newspaper, and dictionaries. Therefore, extracting these word compounds into meaningful information is an important aspect. Mechanical field word compounds often appear in Arabic texts, which make these words have an important role. Compounding is a very productive word-formation process in many Arabic languages as stated by Najar et al., [1]), (Altakhaineh, [2]), (Altakhaineh & Zibin, [3]), (Mezghanni & Gargouri [4]) Compound words abundance in Modern Arabic Standard (MSA). These two words often appear together to express meaning and reference. In the field of mechanics, there is not a synonym for the word compound, such as *معدنيين من قشرة* which means 'bimetal shell.' Finally, despite the development of vocabulary, there is a lack of available resources from Arabic compounds. It is necessary to study compound words.

There are many compound words found in CNN Arabic newspaper and Dictionaries of Arabic *Mu'jam Handasat al-Mikanik al-Musowir* in the subject of

lexicography at 4th semester in the Arabic Translation Department. Dictionaries of Arabic *Mu'jam Handasat al-Mikanik al-Musowir* is a dictionary for the mechanical term for teaching-learning activity in Arabic Translation Department. Automatically, this dictionary uses the Arabic language. There are two reasons why these mechanic terms are interesting to study. First, the Dictionary of Arabic *Mu'jam Handasat al-Mikanik al-Musowir* uses the Arabic language. This dictionary facilitates people to find Arabic mechanic terms. Second, there are many compound words found in this dictionary. For examples, *إختكاك حركي* 'kinetic friction', *إختكاك انزلاقي* 'rolling friction', *إختكاك جاف* 'sliding friction', *إختكاك حدي* 'dry friction', *إختكاك حدي* 'boundary friction', *إختكاك سكوني* 'static friction', *إختكاك مائع* 'fluid friction'. Data have been studied from the morphology point of view. Based on the explanation of the background of the study, the problem to be analyzed in this paper is formulated as follow: 1) what are the types of compound word in Arabic mechanic term? 2) how is the compound word represented to convey the Arabic mechanic term?

Morphology is the study of word formation, including new ways words are created in world languages, and ways the words formed vary depending

on how they are used in the sentence, Morphology is the study of word formation, including new ways words are created in world languages, and ways the words formed vary depending on how they are used in the sentence, [5]; [6]; [7]. Morphology is the study of the internal structure of words as described by (Haspelmath & Sims, [7]), (Yule, [8]. Morphemes can be divided into bound, free, and zero morphemes. A free morpheme may constitute a word (free form) by itself, [8]; [9]; [10]. For example: القوة 'force', القدرة 'power', الإهتزاز 'vibration', التردد 'frequency' etc. Bound morpheme must appear with at least one other morpheme, bound or free, in word [8]; [11]. Such as عمارات + ة → عمارة this word consists of عمارات 'apartment building' as free morpheme and ة is bound morpheme. A zero morpheme is a zero allomorph without phonemic content, for example, the zero plural and singular have the same form such as نواليت مرق [maraq tuwalit] 'toilet paper'; سفنج [safani] 'sponge'; فرشاة [fursaa] 'brush.'

According to (Lieber [6]) a morphological process is a process of forming new words by modifying a morpheme or morphemes. The following are morphological processes: addition or affixation, reduplication, replacement, cliticization, stress and tone replacement, borrowing, clipping, and compounding. The compound word consists of the addition of stems in which a word is formed by the combination of two independent words. The parts of the compound can be free morpheme, derivative word, or another compound [8]; [7]; [12]; [13]. Compounding is a process of combining lexical categories (Noun, Verb, Adjective, or Preposition.) to create a larger word and the resultant meaning is new or different from its element [15]; [14]).

The examples in table 1 as the below:

Table 1. Free morpheme

No	Gloss	IPA	Lexical category	meaning
1.	إِخْتِكَاك	[iħtikāk]	(noun)	'friction'
2.	مَائِع	[mā'i']	(adjective)	'fluid'
3.	تَدْبَدْب	[taɖabɖub]	(noun)	'vibration'
4.	تَدْبَدَب	[taɖabɖaba]	(verb)	'to vibrate'

IPA refers to <https://www.internationalphoneticalphabet.org/ipa-sounds/ipa-chart-with-sounds/>

The next example is presented the lexical categories

Table 2 the lexical categories

No	Lexical category		Lexical category	Compound word	Meaning
5.	إِخْتِكَاك	+	مَائِع	إِخْتِكَاك مَائِع	'fluid friction'
	(noun)	+	(adj)	(noun + adj.)	
6.	تَدْبَدَب	+	القَسْرِي	تَدْبَدَب الْقَسْرِي	'forced oscillation'
	(verb)	+	(noun)	(noun + verb)	

This work explores the main compounding pattern of Arabic mechanical terms by documenting them from their lexicographic subject in the translation department. Thereby this article tries to fill the gap between experts because compound words do not receive much attention. Based on the statements above these writers are interested to analyze compound words in Dictionaries of Arabic *Mu'jam Handasat al-Mikanik al-Musowir* in the subject of lexicography at 4th semester in Arabic Translation Department, Syarif Hidayatullah State Islamic University Jakarta. By so doing, the writers give the title Compound Words in Arabic Mechanical Term.

2. METHODOLOGY

Apply the style as required based on the content and context. (Please don't highlight your text in yellow. This is descriptive qualitative research with a content analysis method to analyse the form and meaning mechanic compound words. The data source is categorised into primary and secondary. First data is vocabularies in mechanic dictionaries and CNN newspaper for the period 2018-2019. Secondary data resources relevant was taken from some references related to the concept of the compound word. The subject of this research is compound words. The objects of this research are the forms of compound words and the meanings of compound words. The data is collected by using the documentation method and note technique as mentioned by (Sudaryanto [16]). The writers performed several procedures to obtain the data. First, the writers read the dictionary many times to understand the whole Arabic mechanical term related to this study. Second, the writers identified the problem as the primary trouble. Third, the writers applied and synthesized the theory and the problem of the mechanic term. The fourth, the writer took note of the data found selecting compound words and retyping. The data is analysed by using a tree diagram (Plag's theory) and identifying meaning using Haspelmath's theory)

3. FINDING AND DISCUSSIONS

This study intends to answer two questions, namely (1) what are the types of compound words in Arabic mechanic terms?, and (2) what lexical categories are represented to convey the Arabic mechanic term? The results and discussion are as below.

3.1 Finding

Types of Compound Processes in Forming Arabic Mechanic Compound Words. There are three types of compound processes in forming Arabic mechanic compound words which were found by the researcher, namely Endocentric Compound, Exocentric Compound, and Copulative Compound.

3.1.1 Endocentric Compound

Endocentric compound refers to a type of compound that means hyponym. Endocentric compounds are compounds consisting of a head and dependents (or several dependents) where the meaning of the semantic head is a hyponym of the overall meaning of the compound word as mentioned by (Haspelmath & Sims, 2013, p. 327). Henceforth [5] describes a similar concept, an endocentric compound is a compound whose compound shows a hyponym of the head element in the compound. Below are examples of endocentric compound words.

Table 3 the examples of the endocentric compound word

No	Example	Meaning
7.	مَحَوْرٌ تِلْسَكُوْبِي	'telescope shaft'
8.	تَجْرِبَةُ الصَّلَادَةِ	'hardness tester'
9.	تَشْوَهُ لَيْبِن	'plastic deformation'
10.	تَرْكِيْبٌ كِيْمِيَايِي	'chemical composition;
11.	حَدِيْدُ الصَّبِّ	'cast iron'
12.	حَدِيْدُ غَامَا	'gamma iron'
13.	فَوْ لَادِ كَرْبُوْنِي	'carbon steel'
14.	بُخَارُ الزَّيْتِ	'oil mist'
15.	بُرْغِي النَّظْمِيْم	'set screw'

The examples listed in table 1 show that the core words of the endocentric compound are on the right. It means that the word has considered endocentric when the first word serves as a modifier of the second word or the head that determine the meaning of the head more precisely.

3.1.2 Exocentric Compound

The exocentric compound is one of the types of compounds which does not contain a headword and dependent word [5]. Exocentric compound refers to something which is not a sub-class of either the elements in the compound, that is they are not hyponyms of either of their elements. Below are examples of exocentric compound words.

Table 4 the examples of the endocentric compound word

No	Example	Meaning
16.	حَطَّ الْعَمَلِ	'continuous mark made on a surface line'
17.	عَاوِلُ السَّنْحَبِ	'a characteristic part of something'
18.	دَوْرَةُ كَرْنُو	'turn in a course'
19.	مُسْتَجِنٌ بَدْنِي	'hot water throws up'

3.2 Discussion

Based on the data analysis, the writer discusses the result of the study. Based on the discussion, the writer discusses the recapitulation of the result of the study. The writer finds three forms of the compound word. The forms are noun compound, verb compound and

adjective compound. The writers find three forms of mechanic compound words. The forms are 1) noun compound, 2) verb compound and 3) Conjunctive compound noun. Below is the explanation of each type of category.

1. Noun Compound

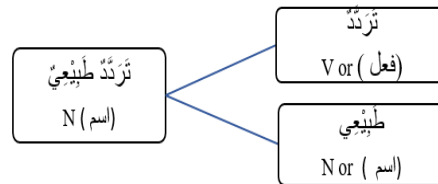
Noun compound is a word-forming process made up of more than one word and functions as a noun. There are several ways to form a noun compound. Those are in table 5 as follows:

Table 5 the examples of noun compound word

Example									
16.	Noun	(اسم)	+	Noun	(اسم)	→	Noun	(اسم)	Meaning
	إِجْهَادٌ		+	نَظْمِيٌّ			إِجْهَادٌ نَظْمِيٌّ		'normal stress'
17.	Adjective	(نَعَوْت)	+	Noun	(اسم)	→	Noun	(اسم)	
	سَاكِنٌ		+	حَمْلَةٌ			حَمْلَةٌ سَاكِنٌ		'static loading'
18.	Verb	(فَعْل)	+	Noun	(اسم)	→	Noun	(اسم)	
	لَتَى		+	إِجْهَادٌ			لَتَى إِجْهَادٌ		'minimum stress'
	جَسْمٌ		+	حُرٌّ			جَسْمٌ حُرٌّ		'free body'
19.	Noun	(اسم)	+	Adj	(نَعَوْت)		Noun	(اسم)	
	نَبْيَسٌ		+	صَنْخَرٌ			نَبْيَسٌ صَنْخَرٌ		'dowel pin'

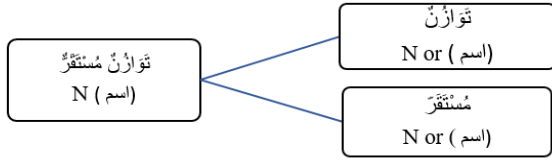
Here, the writer presents one example of noun compound in tree diagram 1a and 1b

- a. تَرَدَّدٌ طَبِيعِيٌّ 'natural frequency', it is in tree diagram 1a



The compound word تَرَدَّدٌ طَبِيعِيٌّ is formed by combining the lexical category تَرَدَّدٌ [Verb] and the lexical category طَبِيعِيٌّ [Noun]. The word تَرَدَّدٌ means 'to hold back, to circulate, to dither, to hesitate, to patronize, to vacillate, to waver, to be of two minds, to frequent.' The word طَبِيعِيٌّ as [Noun] means 'normal, natural, real, fresh, self-evident.' The word تَرَدَّدٌ طَبِيعِيٌّ means details of a 'natural frequency'. It does not mean تَرَدَّدٌ as اسم refers to 'hesitancy, hesitation, indecision, irresolution, vacillation, vibration.' In brief, the combination of the two elements bring new meaning.

- b. مُسْتَقَرٌّ تَوَازُنٌ 'stable equilibrium', it is in tree diagram 1b



The compound word **تَوَازُنٌ مُسْتَقَرٌّ** is formed by combining the lexical word **تَوَازُنٌ** [tawāzun] is (Noun) and the lexical category **مُسْتَقَرٌّ** [mustaqarr] (Noun). The word **تَوَازُنٌ** means ‘residence, seat’. The word **مُسْتَقَرٌّ** means ‘balance, equilibrium’. The word **تَوَازُنٌ مُسْتَقَرٌّ** means details of a ‘natural frequency’. It does not mean **تَوَازُنٌ** as **اسم** means ‘balance; counterpoise; equality; equilibrium, equipoise; evenness; poise.’ Based on this analysis, the combination of the two elements brings new meaning namely ‘stable equilibrium.’

2. Verb Compound

Verb compound is a verb that comprises of couple words. Compound verbs are commonly set up with a hyphen. Most compound verbs comprise a noun phrase along with a verb. In process of verbs, they can be transitive (مُتَعَدِّية أفعال) or (متعد فعل) intransitive. For example, transitive verb, in a sentence **الكلب أنور ضرب** means ‘Anwar (S) hits (V) the dog (O). Further verbs can be intransitive, such as **الكمبيوتر؟ برامج تعمل كيف** or **يوم كل كريم؟ سبج تعمل كيف جسم حر؟**

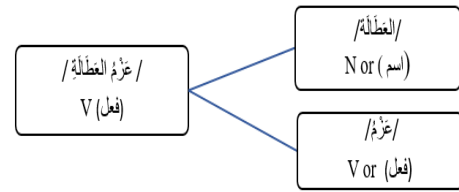
There are four ways to form verb compounds in Arabic mechanic terms. Those are in table 6 as follows:

Table 6 the example of verb compound

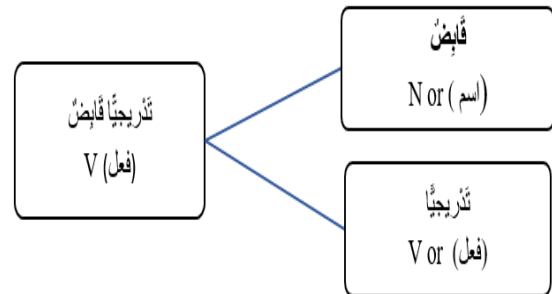
Example						
No.	Noun	(اسم) +	Verb	(فعل) →	Verb	Meaning
20.	عطالة /	(اسم) +	عزم /	(فعل) →	عزم العطالة /	‘moment of inertia’
	الانواء /	(اسم) +	زوية /	(فعل) →	زوية الانواء /	‘angel of torsion’
21.	فريجنيا /	(فعل) +	فريجنيا /	(نعت) →	فريجنيا فريجنيا /	‘friction clutch’
	جسم /	(فعل) +	جسم /	(نعت) →	جسم جسم /	‘footlose’
22.	حركة /	(فعل) +	ثلاثية /	(نعت) →	حركة ثلاثية /	‘translational motion’

Here, the writer presents one example analysis of verb compound.

- a. **عزم العطالة /** ‘moment of inertia’, it is in tree diagram 2a



The compound word **عزم العطالة** is formed by combining the lexical word **عزم** is (verb) and **العطالة** is (noun). The word **عزم** means ‘to set out to do something, enchant; spellbind.’ The word **العطالة** means ‘inertia, joblessness, inactivity’. In brief, the compound word **عزم العطالة** consist of two lexical items. These words occur together to express a specifically meaning. It does not mean **العطالة** as noun or (اسم)



means ‘unemployment, inactivity’ and the **عزم** expresses ‘enchant.’ Shortly, the two elements combine in harmony to deliver new meaning namely ‘moment of inertia.’

- b. **فريجنيا فريجنيا** ‘friction clutch’, it is tree diagram 2b

The compound word **فريجنيا فريجنيا** is formed by combining the lexical word **فريجنيا** is (noun) and **فريجنيا** is (verb). The word **فريجنيا** means ‘controlling, dominant, dominating, holding.’ The word **فريجنيا** means ‘step by step, to increase, to improve, to transform, to explain’. In brief, the compound word **فريجنيا فريجنيا** consist of two lexical constituents. These words occur together to express a peculiar meaning. It does not mean **فريجنيا** as noun or (اسم) means ‘holding, controlling’ and the **فريجنيا** means ‘to explain.’ In short, the two elements combine in harmony to deliver new meaning namely ‘friction clutch.’

3. Conjunctive Compound Noun

There are four ways to form verb compound in Arabic mechanic term. Those are in table 7 as follows:

Table 7 the example of conjunctive compound noun

23.	Noun	+	Noun	+	Conj	+	Noun	→	Noun	Meaning
	تِرْسٌ	+	لَوْلَبِي	+	أَوْ	+	خَلْرُونَ	→	تِرْسٌ لَوْلَبِي أَوْ خَلْرُونِي	'spiral gear'
24.	بَاسْتَا	+	تِرْسٌ	+	و	+	دُودِي	→	عِجَاةٌ وَ تِرْسٌ دُودِي	'worm gear'
	Noun	+	Noun	+	Prep	+	Noun	→	Noun	
25.	الْجَزَاءُ /	+	التَّثْبِيتِ	+	مِنْ	+	مُحْرَكِ	→	الْجَزَاءُ الثَّابِتِ مِنَ الْمُحْرَكِ	'engine'
26.	صَمَامٌ	+	التَّحْكَمِ	+	فِي	+	الصَّنْعَةِ	→	صِمَامُ التَّحْكَمِ فِي الصَّنْعَةِ	'pressure control valve'

The conjunctive compound word عِجَاةٌ وَ تِرْسٌ دُودِي is formed by combining the lexical word عِجَاةٌ is (noun), و is conjunction تِرْسٌ is (noun) and دُودِي . The word عِجَاةٌ 'dough, pasta', و means 'and', تِرْسٌ 'gear, shield', دُودِي 'wormy, marked with close wavy lines'. As result, the conjunctive compound noun عِجَاةٌ وَ تِرْسٌ دُودِي consist of three lexical constituents. These words occur together to indicate a distinctive meaning. The composition of the four elements combines in harmony to convey a new meaning namely 'worm gear.' In a few words, this analysis found that there are three types of compound words in the mechanical field, namely noun, verb, and conjunctive. This finding also shows that a) adjacency or closeness shows that no intervening elements can be inserted between the head and the non-head of compounds, b) contrast with referentiality reveals that insertion is allowed in the phrase. These findings are different from sBounhas and Slimani (2009). It has quoted by Omar & Al-Tashi [13] who said the Arabic noun compound has five classes. She described it, such as follows: annexation (اضافى مركب), adjective (مركب و صفى), prepositional (مجرورة مركبة اسماء), conjunctive (موصولة مركبة اسماء), compound nouns linked by composite relations (العلاقات مجمعة مركبة اسماء).

4. CONCLUSION

After finding and analyzing mechanic compound words in Dictionaries of Arabic Mu'jam Handasat al-Mikanik al-Musowir by applying word-formation of Plag's theory and the semantic grammatical Nick Riemer's theory. It can be concluded that there are three types of mechanic term compound words based on semantics grammatical categories. Each type is categorized into different lexical categories. Lexical categories that often appear to form mechanic compound words are such as nouns, verbs, adjectives, conjunctions, and prepositions.

AUTHORS' CONTRIBUTIONS

The authors' contribution explains mechanical terms in Arabic can be considered as part of the formation of complex compound words in the Arabic language because it has various forms. From the point of view of the Indonesian Arabic translator practitioner, the term mechanic is an important domain in realizing the actual contribution of Arabic lexicographic studies and practice understanding the process of word-formation.

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