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ANALYSIS OF ROCKET DETERMINATION IN ARTILLERY SHOT ASSISTANCE TO SUPPORT BEACH DEFENSE OPERATIONS

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Abstract
Fire Assistance Operations are assistance to elements of the Army troops that dock in enemy areas with several elements such as Infantry and armored units in the form of firing ground artillery fire, artillery ships and attack aircraft hunters as well as aerial bombing, so that fire support operations are needed in several series of Military Operations. The combat of fire assistance is an element that can increase the morale of the troops themselves when carrying out attacks and when carrying out defenses. The writing of this paper aims to obtain the best choice of rockets so that they can be used in fire support optimally and can realize a strong coastal defense in a country. At this writing, the final results were obtained using the AHP (Analytical Hierarchy Process) method, the best alternative was obtained according to several criteria according to the Experts that the best rocket choice was the XXX NORINCO type, after obtaining the best choice of rocket type for fire assistance via SWOT, the best strategy was obtained what effort which will be carried out in support of strengthening the Coastal Defense System, namely Strategy WO 4, namely through "Assistance for Research Workers to Conduct Research Through Research and Development Institutions for Transport Vehicles That Are Ideally Used When Carrying Out Shot Assistance".
Keywords: Military Operations, Artillery, Fire Aid Operations, Expert, Analytical Hierarchy Process

INTRODUCTION

Coastal Defense Operations are a joint operation of an X Armed Forces organized by a unit consisting of 2 (two) or more dimensions, either land, sea, or air as an air operation implementing unit in order to thwart enemy amphibious assault operations in certain coastal areas in Indonesia. the territory of a country X.[1]Meanwhile, Fire Assistance Operations are assistance to the elements of the Army that are docked with several elements such as Infantry and armored units in the form of firing ground artillery fire, ship artillery, and attack aircraft hunters as well as aerial bombing.[2]Fire support operations are required in several series of War Military Operations or Military Campaigns such as fire support in Amphibious Operations, Joint Ground Operations, and Coastal Defense Operations. Fire assistance is an element that can increase the morale of the troops themselves when carrying out attacks and when carrying out defenses. This is because artillery fire can destroy the enemy's attack axis and destroy enemy defenses on the front lines, making it easier for their own troops to seize targets that have been set in accordance with the Operational Order.

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[1]Arch Whitehouse, Amphibious Operation (New York: Arch Whitehouse, 1963), 153.

[2]. Arch Whitehouse, Amphibious Operation (New York: Arch Whitehouse, 1963), 257.

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The advantages of rocket artillery are high destructive power and long-range of fire. In addition to the advantages of rocket artillery, it also has weaknesses such as large dimensions that can make maneuvering mobility difficult. In order for the rocket artillery to provide fire support effectively, it is necessary to select the type of rocket according to the operational needs in order to realize a strong coastal defense system. The main purpose of this paper is to get the best choice of rockets so that they can be used in fire support optimally and can realize a strong coastal defense.

By using the Analytical Hierarchy Process (AHP) method to determine the type of rocket that will be used to provide fire support in the face of potential threats based on balingstra that is developing in certain areas of a country. For the optimal implementation of Coastal Defense Operations, the analysis uses the Strengths, Weaknesses, Opportunities, and Threats (SWOT) methods by considering the strengths, weaknesses, opportunities, and threats of the Armed Forces of country X.

METHODS

The literature that became the reference in this paper was obtained to support the research. The literature includes books and papers entitled Marketing Strategy and Management(Baker, 2000), *Analytical Network Process in the Framework of SWOT Analysis for Strategic Decision Making (Case Study: Technical Faculty in Bor, University of Belgrade, Serbia)* (Živkovi, Nikolić, Djordjević, Mihajlović, & Savić, 2015), *An Overview of Strategic Management: An Analysis of the Concepts and the Importance of Strategic Management* (Athapaththu, 2016), *Maritime Strategy and the Balance of Power* (Hattendorf & Jordan, 1989), *I'Swot Model for Formulation of Regional Leading Agro Industry Development Strategy in North*

Sulawesi(Mirah, 2004), *Evaluating tourism potential: A SWOT analysis of the Western Negev* (Collins-Kreiner & Wall, 2007), *SWOT Planning*(Hill & Westbrook, 1997), *Strategy Map for Hospital Management: Perspectives and Priorities* (Niemiec, 2016), *SWOT Analysis Techniques to Dissect Business Cases*(Rangkuti, 2003), *Variations in Strategy Perception among Business and Military Managers*(Özleblebici, Pinto, & Antonio, 2015), *China's strategy in the Middle East (The Silk Road Project)*(Al-Rawashdeh & Al-Qatatsheh, 2017), *Proposed Sales Division Strategic Planning with SWOT Analysis Method and AHP (Case Study: PT Telekomunikasi Indonesia East Telkom Division Witel Suramadu)*(Cahyaningrum & Rukmi, 2014), *Integrating AHP, SWOT and QSPM in Strategic Planning an Application to College of Business Administration in Saudi Arabia*(Malik, Al-Khatani, & Naushad, 2013), *Factors that influence the efficiency of beef and dairy cattle recording system in Kenya: A SWOT - AHP analysis*(Wasike, Magothe, Kahi, & and Peters, 2010)

The AHP (Analytical Hyrarcy Process) approach was developed from measurement theory related to quantitative and or "intangible" decision criteria. Therefore the principle of this approach seeks to accommodate aspects of cognitive, experience, and subjective knowledge. In the last decade, the AHP approach has been widely used as a decision support tool in a variety of problematic situations.[3]The integration of the AHP approach with optimization approaches such as multi-objective programming and goal programming is used in broad practical technical and management applications such as environmental, energy, and information system problems.[4]

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[3] Saaty, TL (2000). Fundamentals of Decision Making and Priorty Theory with the. In RWS Publications.

[4] Ciptomulyono, U. . Fuzzy Goal Programming Approach for Deriving Priority Weights in the

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Meanwhile, SWOT analysis is the most common technique that can be used to analyze strategic cases.[5]SWOT is a tool that is often used to analyze the internal and external environment to achieve a systematic approach and support for decision situations.[6]SWOT is an acronym for strengths (S), weaknesses (W), opportunities (O) and threats (T). The first two factors (strengths and weaknesses) relate to the internal factors of the organization, while opportunities and threats cover the wider context or environment in which the entity operates.[7]

The AHP (Analytical Hyrarcy Process) analysis in this paper is used to determine the best Alutsista from the existing alternative Alutsista options owned by the Rocket Battalion of the Artillery Regiment of a country X so that the implementation of the Coast Defense Operations strategy can be carried out effectively and efficiently. The stages of determining the Rocket to be carried out are as follows:

1. Determination of Criteria and Experts. In determining the criteria for experts, it depends on law or decision determined by a particular country, where this is carried out for the purpose of selecting competent experts in the field of weaponry, especially rocket weapons. Here the author will assume to ask for some expert opinions consisting of several battalion commanders of combat units (assumptions) to determine the criteria to be used in selecting the best rocket using the AHP method.

2. Alternative Selection. Based on data processing, several criteria were obtained using aspects consisting of, among others: general requirements, technical requirements, tactical requirements,

maintenance, and risks that will be used in selecting the best rockets for fire support, as follows:

1. DESTRUCTIVE POWER
2. EFFECTIVE RANGE
3. LAUNCH SYSTEM
4. CONTROL SYSTEM
5. ACCURACY
6. MANEUVER
7. TRANSPORT VEHICLE
8. ENDURANCE

After obtaining 8 (eight) criteria in determining the best rocket to be used in the selection method using AHP (Analysis Hierarchy process), the author makes a hierarchical tree to be used as a benchmark in calculating pairwise comparisons, for a paired hierarchical tree, it will be shown in Figure 1 below:
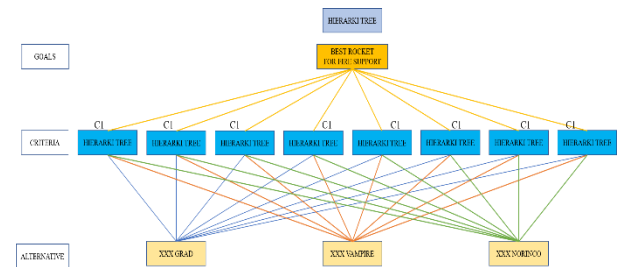
Picture1. Hierarchy Tree Determination of the Best Rocket Alternative
Source: Data Processed by the Author

RESULTS AND DISCUSSION

After the Hierarchy tree is made, the next step is to carry out a questionnaire by asking for opinions from the Experts who are categorized as decision-makers in each Main Unit Command, the author makes a scenario for the best Rocket selection stage to give the questionnaire to the Troop Commanders x, y

Analytical Hierarchy Proces (AHP) Method. Journal of Applied Sciences Research , 2008. Hal 171

[5] Hill, T. SWOT Planning, 1997. Hal 30.

[6] Wheelen, T. L. Strategic Management and Business Policy : Toward Global Sustainability, edisi ke 13, (New Jersey: Pearson Education, 2012).

[7] Collins- Kreiner, N. &. & Wall, G., Evaluating tourism potential: A SWOT analysis of the Western Negev. Israel,Tourism, 2007, 51 - 63.

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and z with the selected format as follows, the criteria are coded as follows:

Table.1 Coding of Criteria Based on Alphabet

CRITERIA 1	DESTRUCTIVE POWER	C1
CRITERIA 2	EFFECTIVE RANGE	C2
CRITERIA 3	LAUNCH SYSTEM	C3
CRITERIA 4	CONTROL SYSTEM	C4
CRITERIA 5	ACCURACY	C5
CRITERIA 6	MANEUVER	C6
CRITERIA 7	TRANSPORT VEHICLE	C7
CRITERIA 8	ENDURANCE	C8

Source: Data Processed by the Author

Next is to enter the results of the questionnaire from the Experts into the Matrix Table in pairs with the results of the Geomean table from several experts here consisting of 3 Experts which are obtained as follows:

Table. 2 Pairwise Comparison Geomeans for the three Experts

Geomean	C1	C2	C3	C4	C5	C6	C7	C8
C1	1.0000	0.5000	1.0000	0.2500	0.5000	0.7500	0.2500	0.6667
C2	2.0000	1.0000	0.5000	2.0000	1.0000	0.6667	2.0000	0.3333
C3	1.0000	2.0000	1.0000	4.0000	2.0000	1.3333	4.0000	0.6667
C4	4.0000	0.5000	0.2500	1.0000	0.2000	0.1667	1.0000	0.1667
C5	2.0000	1.0000	0.5000	5.0000	1.0000	0.6667	2.0000	0.3333
C6	1.3333	1.5000	0.7500	6.0000	1.5000	1.0000	3.0000	0.5000
C7	1.3333	0.5000	0.2500	1.0000	0.5000	0.3333	1.0000	0.1667
C8	1.5000	3.0000	1.5000	6.0000	3.0000	2.0000	6.0000	1.0000

Source: Data processed by the author

After getting the Geomean value from the three Experts, the next step is to calculate the comparison matrix between the selected criteria with the results shown in the tables below:

Table.3 Comparison Matrix between Criteria

	C1	C2	C3	C4	C5	C6	C7	C8
C1	1.0000	0.5000	1.0000	0.2500	0.5000	0.7500	0.2500	0.6667
C2	2.0000	1.0000	0.5000	2.0000	1.0000	0.6667	2.0000	0.3333
C3	1.0000	2.0000	1.0000	4.0000	2.0000	1.3333	4.0000	0.6667
C4	4.0000	0.5000	0.2500	1.0000	0.2000	0.1667	1.0000	0.1667
C5	2.0000	1.0000	0.5000	5.0000	1.0000	0.6667	2.0000	0.3333
C6	1.3333	1.5000	0.7500	6.0000	1.5000	1.0000	3.0000	0.5000
C7	1.3333	0.5000	0.2500	1.0000	0.5000	0.3333	1.0000	0.1667
C8	1.5000	3.0000	1.5000	6.0000	3.0000	2.0000	6.0000	1.0000

Source: Data processed by the author

Table. 4 Consistency Ratio Matrix Comparison Between Criteria

NORMALISASI	CHECKING CONSISTENCY		
	Product	RI	
0.0814	0.6773	8.3194	
0.0997	0.8943	8.9694	
0.1729	1.5444	8.9300	
0.0694	0.6321	9.1015	
0.1146	1.1027	9.6252	
0.1497	1.4142	9.4460	
0.0528	0.4743	8.9837	
0.2594	2.3166	8.9300	
1	CI	0.0048	
	CI/RI	0.0033	Consistent

Source: Data processed by the author

Table. 5 Best Alternatives selected

Penentuan Alternativ terbaik		
	BOBOT	KET
XXX Grad	0.1722 2	TIDAK
XXX Vampire	0.1286 3	TIDAK
XXX Norinco	0.2373 1	ALTERNATIF TERPILIH

Source: Data processed by the author

From the data above, it was obtained based on the opinion of the Experts for the choice of the best rocket, the XXX NORINCO type with the order of choice:

1. XXX NORINCO.
2. XXX GRAD.
3. XXX VAMPIRE.

After the selection of the alternative selection of the ideal rocket for the coastal defense system, it is then necessary to analyze the ability of the Rocket Battalion of an X Artillery Regiment in providing fire support so as to produce a strategy formulation to produce an optimal coastal defense system, using the SWOT (Strength, Weakness) method. , Opportunities and Threats) Strengths, Weaknesses, Opportunities, and Threats. This can be done through the results of Brainstorming and a formulation based on the theory of Andrew J. Good Paster Strategy Covers What We Should Do (Ends), How We Should Do It (Ways), And What We Should Do It With (Means) that Strategy Is Science and Art How to use the available facilities/potentials to achieve the goals that

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have been determined[8]. The author tries to map some of the identification results based on the SWOT theory as follows:

Picture. 2Basic Theory of Strategic Concepts
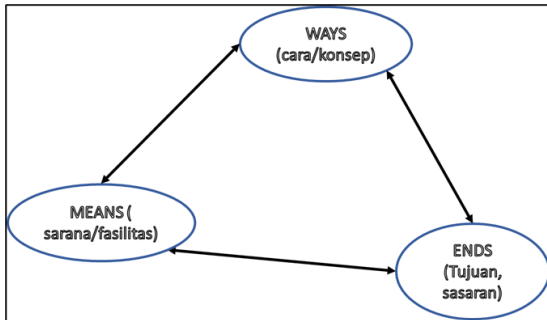
Source: Data processed by the author

I. Strength Factor
1. Fast mobilization.
2. Great destructive power.
3. Careful shooting under all conditions.
4. Supported by new technology.
5. Lots of ammo variations.

II. Weaknesses
1. Short-range combat.
2. Steling shift.
3. The danger of air attack.
4. Requires a large area in placing the top position of the rocket.
5. Requires combination with other rockets.

III. Opportunity Factor
1. Huge defense budget.
2. The policy of the Chief of Naval Staff towards combat units.
3. The participation of the domestic and foreign defense industry.
4. The development of the world of technology.
5. Lots of unused ammunition was provided by the Navy.
6. The number of research personnel from within the country

IV. Threat Factors (Threats)
1. Limited spare parts.
2. Fluctuating conditions of the policy.
3. Transportation assistance during Amphibious Operations.
4. Lack of involvement in assignments.
5. Lack of regular checks.
6. Threat of embargo of defense equipment system.

After the weighting is carried out through the Ephas-Ifas Matrix and entered in the Ephas-Ifas Matrix Graph, it will be shown in Figure 3 as follows:

Picture. 3Strategy Quadrant
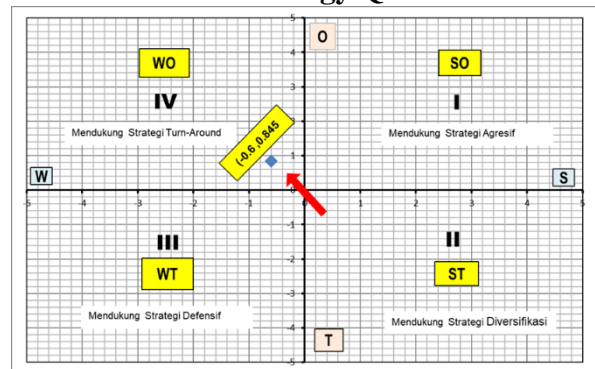
Source: Data processed by the author

In figure 3 (SWOT quadrant coordinates) that the right strategy is in quadrant III, a combination of weaknesses-opportunities (WO). This means facing enormous external opportunities but on the other hand facing several internal constraints/weaknesses. From this, the focus of the strategy is to minimize internal weaknesses so that they can penetrate better opportunities.

Table.6 SWOT Matrix

Source: Data processed by the author

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[8] Best Practices in National Security Affairs, 125

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Based on the results of the SWOT matrix in Table 6, the WO strategies are formulated, including:

a. The WO 1 strategy implemented was to ask for the assistance of research personnel to carry out research through R&D institutions in order to obtain a breakthrough on how to modify the XXX NORINCO Rocket during operation so that the cruising range could be increased or there was an increase in the distance traveled in battle. The strategy is formulated from the results of the cross-product between the weakness factors of W1, W2, and Opportunities O1, O6.

b. The WO 2 strategy implemented is to increase the cooperation of side agencies, among others, with the Air Force and Air Wing so that training is often carried out in the protection of air umbrellas in a series of Amphibious Operations so that they are trained in the protection of rocket weapons that are carrying out shooting assistance. The strategy is formulated from the results of the cross product between the weakness factors of W2, W3, and Opportunities O1, O2.

c. The WO 3 strategy implemented is to apply new equipment to the Decision Maker to add to the existing equipment or to engineer technology to assist the existing control system due to the need for a combination of electronic systems owned by other equipment. The strategy is formulated from the results of the cross-product between the weakness factors of W5 and Opportunities O1, O2.

d. The WO 4 strategy implemented was to request assistance from research personnel to carry out research through R & D institutions for the ideal transport vehicle to be used when carrying out fire support. The strategy is formulated from the results of the cross-product between the Weaknesses W1, W4, and Opportunities O1, O3, and O4.

e. The WO 5 strategy implemented is to carry out periodic control of transport vehicles for rocket transporting vehicles, both KRIs and rocket transport trucks when carrying out operations. The strategy is formulated from the results of the cross-product between W4 Weaknesses and O1, O2, and O3 Opportunities.

From the strategy formulation above, there are 5 (five) strategy formulations that will be used as strategies to increase the capability of the coastal defense system when carrying out OMP (Military War Operations).

From the results obtained, there are 5 (five) strategy formulations that will be used as strategies to increase the capability of the coastal defense system when implementing OMP. From these 5 (five) strategies, a priority sequence of strategies is taken to be implemented first to be used as a priority scale strategy in order to increase the ability of fire assistance, in this case, the authors carry out weighting using AHP to obtain priority strategies that will be implemented first in an effort to realize these things. the above with the help of the Experts,

Image of the Hierarchy Tree for determining the chosen strategy

WO STRATEGY (INCREASE THE SUPPORT FIRE)

Source: Data processed by the author

Table 7. Pairwise Comparison determining priority strategy

	WO 1	WO 2	WO 3	WO 4	WO 5
WO 1	1	1/4	1/7	1/9	1/3
WO 2	4	1	1/2	1/3	2
WO 3	7	2	1	1/2	9
WO 4	9	3	2	1	5
WO 5	3	1/2	1/9	1/5	1

Source: Data processed by the author

Table 8. Preferred priority strategy

WO 1	0.042	5
WO 2	0.151	3
WO 3	0.272	2
WO 4	0.455	1
WO 5	0.080	4

Source: Data processed by the author

From the results of the calculation and weighting above, the WO 4 strategy was chosen as the first priority strategy that must be implemented in order to increase the fire support capability in implementing the Coastal Defense System. Alternative strategies that can be used from the five alternative strategies, the best strategy is obtained based on the ranking, namely "***Research Staff Assistance To Conduct Research Through R&D Institutions For The Ideal Transport Vehicle To Use When Carrying Out Fire Assistance***"

CONCLUSION
a. From the results of the final AHP calculation, it shows that the XXX Norinco is selected as a fire support rocket if it is used when carrying out fire assistance combat operations.
b. That cooperation with R&D is a strategy that must be carried out on a priority scale because this research will immediately improve the defense system capabilities used by an armed force in carrying out OMP (Military War Operations) to improve a country's defense system.

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