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Project Management in the Development of Air Without Tire (Case Study in Polytechnic Indonesia National Army)

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Abstract

This in a Defense Industry project that can run smoothly towards project goals with predetermined specifications, good project management is needed. Airless Tires is a defense research and development activity as one of the support programs for the readiness of the ground forces. The expected result of this R&D activity is the achievement of the level of readiness of the defense equipment and facilities/sarpras in order to achieve the target of developing the strength of the TNI AD capability towards MEF. Poltekad has an initial plan that is motivated by the role and task of Poltekad to conduct research and observation of obstacles in the process of mobilizing troops who still use tires with air pressure on Rantis. Poltekad sets a long-term goal to create defense technology innovations that can benefit the TNI, which is realized through the short-term goal of making Airless Tires. In this article, the author hopes that this research can continue to the commercialization stage, so that Airless Tires can be used in tactical vehicles for the Indonesian National Army Army, Indonesian Navy, and Indonesian Air Force.

Keywords: Project Management, Development, Air Without Tire

INTRODUCTION

A project is a series of specific activities to achieve specific results. This all-special nature means that when the desired result has been achieved, the series of activities is also stopped, and in the short term such activities will no longer be carried out. This means that a project is not a routine activity that is carried out continuously, but only involves a certain period of time. This project is a special activity that is very different from the routine activities that are carried out in the form of producing textiles and then marketing them. This project also has a specific purpose which when the specific goal (replacing the engine) has been achieved, then all the related project activities will be completed.

Because the project is a series of activities to achieve a certain result, before the preparation and stipulation of an activity, the project can be defined as a temporary activity that lasts for a limited period of time, with the allocation of certain resources and is intended to carry out tasks whose targets have been clearly outlined. clear. The uniqueness of project management is of two kinds.

1. Projects always interact with the cost of time and performance. The budget dimension means that project activities must be completed at a cost that does not exceed the budget. The schedule dimension means that the project must be completed in a timely manner. The quality dimension means that the quality of work must be in accordance with predetermined performance standards. These three components can interact to form a unique combination. For example, a project is completed later than the agreed schedule, as a result the budget increases, and the quality of work may be better, and so on.
2. Borrowing and integrating functional resources from departments within the organization has the potential to cause conflict. This conflict occurs because personnel in the

organization are sometimes more concerned with project work than the routine work of the organization. This is especially true if the project being carried out uses resources across work units within the organization. Of course, the main activities that require their expertise to be disrupted. In addition, the frequency with which a person gets projects too often also creates envy for other staff. If this is the case, conflicts can arise which can further disrupt organizational productivity.

Project management is management applied to a project to achieve a certain result, or, project management is a science and art for planning, organizing, directing, coordinating, and supervising. controlling) of people and goods to achieve certain goals of a project. With this understanding it is clear that all management functions must be used to manage a project, so that the goals desired by the project can be achieved smoothly.

Building a strong national defense system requires at least four considerations: the geographical factors of the country concerned, the national resources of a country, analysis of possible threats that will emerge, and the development of information technology. Defense cooperation is inevitable due to the uncertain strategic environment situation and the similarity of strategic interests. In the current global context, threats to state sovereignty have developed in line with technological developments. Defense technology is always considered to represent the present because it is always driven by deterrence capabilities to be able to answer demands and respond to ever-changing threats. Therefore, defense products have always been state of the art. In that context,

The domestic defense industry is one of the spearheads of a country's efforts to develop a defense system independently. This is related to the fulfillment of needs both in the context of providing quality and quantity of defense equipment in accordance with regional characteristics and eliminating political dependence on other countries. Recent government policies have prioritized the development of defense equipment by prioritizing independence and renewal of the defense system production system, the implementation of which is in accordance with the TNI development program through the Minimum Essential Force (MEF) program. The Ministry of Defense together with the Ministry of State-Owned Enterprises (BUMN) develops defense equipment in order to create the fulfillment of defense equipment from the domestic defense industry.

Airless Tire Technology is a technological innovation in the development of advanced and modern defense equipment. Currently, the vehicles used in the ranks of the TNI AD, especially tactical vehicles, still use tires with fluid or air pressure as cushions, if when used in training situations or in the operating field, they are very prone to leaks or tire bursts, so that it will greatly hamper the success of the task. TNI AD principal in carrying out training maneuvers and operating assignments. Taking into account several weaknesses related to vehicle tires that use air pressure, it is necessary to innovate to overcome these conditions by designing types of tires that use tires without air pressure. So therefore,

Reported from the statement from the Commander of the TNI AD Kodiklat Poltekad, Brigadier General Nugraha Gumilar (2020), that these Airless Tires are still designed to withstand a load of 2 tons to 4 tons, in the future they still need to continue in R&D activities so that they can be used on other tactical vehicles. In addition, it is estimated that it will take

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about two more years for the R&D results of Airless Tires to continue to the production stage. Currently, the results of R&D for Airless Tires are still not a prototype, but have entered the R&D stage of testing. One of the tests carried out by Poltekad is the tire endurance test with shots (Anshori, 2020). The test was carried out by shooting tires using 5.56 mm caliber bullets from a maximum distance of 100 meters. The trial gave the results that the tires were still comfortable to use (KKIP, 2020).

Based on this, R&D for Airless Tires is expected to continue with the support of the availability of the number and quality of human resources, adequate R&D budget, complete facilities and infrastructure, and the commitment of policy makers to use the results of R&D for Airless Tires so that they do not stop and continue to the next stage. production. However, the Commander of the TNI AD Kodiklat Poltekad, Brigadier General Nugraha Gumilar (2020) stated that the role of Poltekad was only limited to carrying out R&D and providing formulations for the manufacture of Airless Tires. . Furthermore, so that the R&D activities of Airless Tires do not stop and can be refined so that they can be mass produced, the need for strategic management that will provide direction and strategies for Poltekad in achieving goals. In determining and deciding a strategic decision, a mechanism or process for systematic decision making is also needed. The process of making strategic decisions is known as strategic management.

DEFINITION OF PROJECT MANAGEMENT

Project management is the application of processes, methods, skills, knowledge, and experience to achieve certain project objectives according to agreed criteria or parameters. Good project management must be able to utilize the team and available resources to be able to complete the project with a predetermined time limit, cost, and scope (www.logique.co.id, 2021).

Project management is the business of working on a project that is limited by budget, schedule, and quality with the aim of achieving the project efficiently and effectively. The working effort referred to above includes the Planning, Organizing, and Controlling processes (Bruce, 2003). Project management is the application of knowledge, expertise and skills, the best technical methods and with limited resources to achieve predetermined goals or objectives in order to obtain optimal results in terms of performance, time, quality and work safety. Another definition of project management is an activity of planning, organizing, directing,

The role of Project Management is to plan, organize, direct, and control organizational resources to achieve the goals (projects) within a clear time, cost, and quality. Project management is the key to success in implementing and completing an assigned project. The main focus of project management is the achievement of all project objectives with all available constraints, time and available funds. Planning for a system project requires various components involved in it. One thing that must be considered / prioritized by a project manager in planning is to calculate, both qualitatively and quantitatively, and the risks that will occur in the process of working on the project.

Project management is one of the strategic aspects for businesses and companies in

managing a large activity, without going through the right project management stages, every need will be difficult to plan properly and structured (www.jagoanhosting.com).

Project Management Process In Defense Industry

The defense industry in carrying out its duties and functions always carries out project management to achieve the company's mission (Istimawan, 1996). Carrying out defense industry project management carries out a series of stages that will be passed from the initial process of project implementation until the project process is completed. One of the goals is to reduce obstacles whose impact in the future will not interfere with implementation. The stages of project management carried out by the defense industry are as shown in the image below.

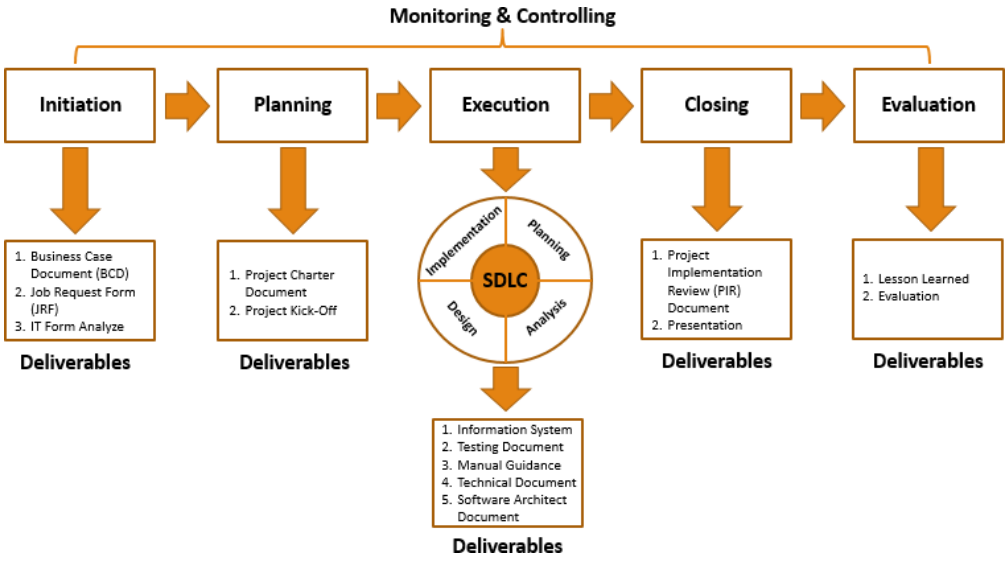

Figure 1. Project Management Process Flow

Project Initiation Phase (Project Initiation Stage)

At this stage the project management carried out is still around pre-planning or is only limited to a general concept description. In this stage, there are several things that must be done which include: Making a development project proposal; Evaluation of the administrative content of the project proposal; and negotiating contracts with contractors. In the conception stage, there are two parts that need to be considered by project implementers, which include:

a) Project initialization is related to the emergence of project development ideas starting from the emergence of problems. Furthermore, the problems found must be clearly formulated along with their complete objectives
b) The feasibility of the project is a process of investigating the problem and there will be the development of existing solutions. There are 3 important things that must be included in this feasibility process, which include what materials are needed, when they will be carried out, and who will be involved in project development.

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Project Planning Phase **(Project Planning Stages)**

After the project conception stage is completed, the next stage of project planning will be carried out. At this stage, there are two things that must be done as well as possible, which include:

a) Preparation of a very detailed project plan which usually contains the work schedule, budget details, human resource plans, problems that may occur, project results test plans, and many others.
b) Doing detailed project determination which contains the project requirements specifications and user requirements specifications. Project requirements include project size, capacity, and speed. Then, user needs include what is needed by the people who will inhabit the project.

This planning stage must be carried out with mature and detailed. Research the plan first before entering the project execution stage. Because, if the plan still has problems and is also unclear, the execution of the project will be hampered as well. Later, the resulting building may not be in accordance with the initial wishes.

Project Execution Phase **(Project Implementation Stage)**

The execution stage is a very long stage to do than the other stages. This stage is a real application of the previous planning stages. Here everything that has been planned will be carried out properly according to the initial planning. However, if it turns out that the prepared plan is not in accordance with the actual conditions in the field, the plan is allowed to be revised in the best way to suit the surrounding conditions. This stage includes several jobs which include the following:

a) Design stage: the specifications that have been designed in the planning stage will be translated into drawings, mockups, or schematics in a clear and easy to understand manner. The architects who play an important role in this design stage are usually assisted by construction management supervisors.
b) Procurement stage: all facilities, materials, and needs to carry out the project will be imported at this stage. The funds for the arrival of these materials come from the budget that has been prepared and of course, quality tools and materials are selected.
c) Production stage: because the design has been completed and all materials and tools have been collected, the project development process will begin. This production is also accompanied by supervision and control of various kinds of resources used so that everything goes well, there is no reduction in materials, and also each worker will carry out their respective duties according to regulations.
d) Implementation stage: at this stage the submission of the final project results will be carried out. Usually, the submission of the project results is also accompanied by various training for users. The purpose of the training is for them to understand well the facilities in it and how to use them.

Project Monitoring & Control Phase **(Project Monitoring and Control Stage)**

Controlling is not only controlling the implementation of organizational programs and

activities, but also supervising so that, if necessary, corrections can be made. Thus, what the staff does can be directed to the right path with the aim of achieving the planned goals. The essence of controlling is the process of ensuring that implementation goes according to plan.

In order for the work to run according to organizational goals and work programs require control, both in the form of supervision, inspection to audit. These words do have different meanings, but the most important thing is how early the deviations that occur can be identified, both in the planning, implementation and organizing stages. So that with this, anticipation, correction and adjustments can be made in accordance with the situation, condition and development of the environment around the organization.

Monitoring process as part of control will record the organization's progress toward expected goals and enable leaders to detect deviations from planning in time to take corrective action before it is too late. Through effective supervision of organizational activities, quality control efforts can be carried out better.

Project Closure Phase (Project Closing Stage)

Finally, the project closure stage is an industrial activity providing an assessment or evaluation of the final project result whether it has achieved its initial goals or still needs improvement. In addition, detailed project reports will be submitted to the management and the company to be used as evaluation documents and company achievement documents.

DEVELOPMENT OF POLTEKAD UNAIR TIRE PROJECT MANAGEMENT

The Army Polytechnic or Poltekad Kodiklat Indonesian Army is an implementing agency under the Indonesian Army Doctrine, Education and Training Command or Kodiklat Indonesian Army, which carries out the duties and functions as a higher education institution within the Indonesian Army. The Indonesian Army Kodiklat is the main command for education that educates officers and prospective officers of the Indonesian Army, in addition to the main command for combat and coaching. The Indonesian Army Kodiklat is in the main command of development and doctrine. Poltekad as a vocational college has the duty to organize education, research, and community service in accordance with the Tri Dharma of Higher Education. The process of establishing the Indonesian Army Kodiklat Poltekad, begins with the formation of the Indonesian Army Instek, which is a technology education institution within the Indonesian Army (Poltekad, 2021).

Airless Tires is a defense research and development activity as one of the support programs for the readiness of the ground forces. The expected result of this R&D activity is the achievement of the level of readiness of the defense equipment and facilities/sarpras in order to achieve the target of developing the strength of the Indonesian Army capability towards MEF. The R&D activity for Airless Tires started since 2017, then continued to R&D phase II in 2019. This Phase II R&D activity is a development of the results of Phase I of Airless Tires design which found various weaknesses from the evaluation and analysis results, including the design on flexible spokes are too complicated, the tread thickness of the tires, and it is necessary to mix additives in the spokes and tire tread materials, as well as the addition of composite fibers to strengthen the tire tread and flexible spokes. Therefore,

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from the results of the Research and Development Phase I, it is necessary to continue research on tires that are more perfect in terms of design, dimensions and material strength as well as print quality and dynamic testing with more varied conditions and loads.

Project Initiation Phase

The implementation of the research has been realized by conducting research and development activities on the Indonesian Army defense equipment technology in order to grow and maintain the ability to innovate and engineer technology to meet the needs of the Indonesian Army defense equipment development. The R&D concept for Airless Tires is to make tire products that do not use air pressure but use polyeurathane as a substitute for air on the spokes. R & D planning for Airless Tires is carried out to determine the design of Airless Tires to be made, determine the strength of the materials to be used. Then ease in the process of manufacture and installation. So that the product of this Airless Tire can be used in all tactical fields.

So far, the troop mobilization process uses tactical vehicles, such as trucks, armored vehicles, and others, which on average still use air tires (air pressure). Inflatable tires can be a problem, because when they are used, they are most likely to leak, explode, or get shot, so that the mobilization process can be disrupted. Departing from this, Poltekad had the idea to make Airless Tires for Indonesian Army tactical vehicles. The goal is to mobilize troops so that obstacles can be overcome, although being shot may still be overcome for the process of moving troops. Then it can be used in all tactical terrain on road and off road. There is also encouragement from external factors. Currently abroad, they are also competing to produce Airless Tires, such as a French tire company.

***Project Planning Phase* (Project Planning Stages)**

The planning stage includes activities fordeveloping the organization's vision and mission, identifying external opportunities and threats, determining strengths and weaknesses, setting goals, making a number of alternative strategies, selecting certain strategies to use, and making strategic decisions that are chosen to be implemented. Related to the strategic planning of R&D activities for Airless Tires. In the planning stage it is necessary to set goals to achieve the desired results. The goal is to create defense technology innovations that can be useful for the Indonesian Army, namely the Airless Tire innovation used on the Rantis. Departing from the initial plan and the goals that have been set, Poltekad has prepared a strategic planning stage carried out in the R&D activities of Airless Tires. The planning stages that have been made are as follows:

a) Data collection and references.
b) Design planning and dimensions.
c) Analysis.
d) Coordination meetings.
e) Preparation of Renlagiat. The Renlagiat is prepared as a guideline in the implementation of R&D projects.
f) Making letters and other administration.

g) Data collection and consultation.
h) Reference setup.

Project Execution Phase **(Project Implementation Stage)**

The next stage is the implementation or implementation. At this implementation stage, it requires the agency or institution to set annual targets, make policies, motivate, and allocate resources so that strategic planning can be implemented. Strategic implementation includes the creation of an effective organizational structure, budget preparation, as well as the development and utilization of information systems, linking compensation to performance. Furthermore, the implementation or implementation phase is carried out in accordance with the planning made by Poltekad. The implementation stage is carried out by a special team that has been formed for the manufacture of Airless Tires. Once finished, the Airless Tire is tested.

The stages of implementing the R&D activities for Airless Tires are carried out as follows:

1. Airless Tire Manufacturing
2. Airless Tire Testing: 1) Static Test. 2) Dynamic Test. 3) Material Test.

The strategic implementation phase also includes the creation of an effective organizational structure. The organizational structure of Airless Tire Research and Development is as follows:

a) Activities: Danpoltekad Kodiklatad.
b) Dalwaslakgiat: 1) Wadanpoltekad Kodiklatad. 2) Head of Poltekad.
c) kalakgiat.
d) Consultant.
e) Technical Officer.
f) Supporter.

In the implementation of R&D activities for Airless Tires, Poltekad needs to allocate available resources so that the implementation can go according to plan. The number of personnel or HR needs in the implementation of R&D and Development of Airless Tires is 12 people, consisting of: a. 1 person active; b. Dalwaslakgiat 2 people; c. Kalakgiat 1 person; d. 1 person consultant; e. Technical Officer 1 person; f. Supporters 6 people.

Project Monitoring & Control Phase **(Project Monitoring and Control Stage)**

Next is the evaluation stage. This stage is the final stage of strategic management. Includes activities to observe whether the strategy is going well or not. This is needed to fulfill the principle that strategy must be continuously adapted to changes that always occur in the external and internal environment. There are three main activities in strategy evaluation, namely reviewing the external and internal factors that form the basis for the formulation of the current strategy. Then measure performance and take corrective actions. Evaluation is carried out regularly, reported from the Renlagiat report and quarterly reports. For example product evaluation, evaluation of test results, constraints and obstacles that

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occur in the field, and evaluation of the final administration.

The evaluation stages carried out are: Collecting test data; b. Report generation; c. Report distribution; d. Final administrative settlement; e. Analysis and evaluation, including:

a) Test results (static test, dynamic test and material test) as well as factors that influence in the field.
b) Obstacles and obstacles that occur in the field.
c) Design and other supporting components resulting from material engineering activities.
d) Plans for refinement and development at the next stage.

***Project Closure Phase* (Project Closing Stage)**

Project Closure is the end of project activities. In essence, the closing stage of this project is to provide a report on what results are obtained from a series of project activities (Universitas Computer Indonesia 2021).

The project closure stage is the Poltekad activity providing an assessment or evaluation of the final results of the airless tire project whether it has reached the initial goal or still needs improvement. In addition, detailed project reports will be submitted to the management and the company to be used as evaluation documents and company achievement documents.

CLOSING

Conclusion

In a Defense Industry project that can run smoothly towards project goals with predetermined specifications, good project management is needed. In this process, many things such as cost, deadline, and project scope have to be planned. In every project there are risks. Moreover, in large projects, the many decisions that must be made make the many possible obstacles and risks that will arise. To avoid these risks, they can be minimized through project management.

The role of Project Management is to plan, organize, direct, and control organizational resources to achieve goals (projects) within a clear time, cost, and quality. Project management is the key to success in implementing and completing an assigned project. The main focus of project management is the achievement of all project objectives with all available constraints, time and available funds. In planning a system project, various components are needed to be involved in it. One thing that must be considered / prioritized by a project manager in planning is to calculate, both qualitatively and quantitatively, and the risks that will occur in the process of working on the project.

Airless Tires is a defense research and development activity as one of the support programs for the readiness of the ground forces. The expected result of this R&D activity is the achievement of the level of readiness of the defense equipment and facilities/sarpras in order to achieve the target of developing the strength of the Indonesian Army capability towards MEF. Poltekad has an initial plan that is motivated by the role and task of Poltekad to conduct research and observation of obstacles in the process of mobilizing troops who still use tires with air pressure on Rantis. Poltekad sets a long-term goal to create defense

technology innovations that can benefit Indonesian Army, which is realized through the short-term goal of making Airless Tires.

The planning stages start from collecting data and references, planning designs and dimensions, analyzing the calculation of the maximum load effect, coordinating meetings, preparing renlagiat, as well as making letters and administration. Through the implementation stages, namely the manufacture of Airless Tires and tests consisting of static tests, dynamic tests, and material tests. Routine evaluations are carried out on the annual report and quarterly reports, through stages consisting of test data collection, report generation, report distribution, analysis and evaluation, and final administrative completion.

Suggestion

For Poltekad Kodiklat Indonesian Army. Poltekad is expected to continue R&D for Airless Tires until they are submitted to the Sreenad level and selected by the user to be able to proceed to the commercialization stage, so that Airless Tires can be used on military vehicles for the Indonesian Army, Indonesian Navy, and Indonesian Army Air Forces.

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