

Project B8 - Universal Dome Standoff Bonding Tool

Post Mortem

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Introduction

The purpose of this memo is to perform a post-mortem of the first semester of capstone. A post-mortem is a process performed at the conclusion of a project which serves to determine and analyze the successful and unsuccessful elements. This process will be performed by dividing the previous semesters project structure into various categories which will then be analyzed for aspects that contributed to the project's success and for improvements that could be made. The categories that will be analyzed include purpose and goals, ground rules and coping strategies, aspects of project performance, tools, methodologies, practices, problems encountered, and organizational actions. For example, the category of ground rules and coping strategies will be explored for any rules that may have been neglected last semester such as meeting time punctuality or for actions that contributed to the groups success such as effective communication between team members. Further examples, including analysis, will be present within the body of the memo. The goal of this process is to determine any deficiencies of last semester's project which may have been detrimental to the cohesion, efficiency, or productivity of the group.

Contributors to Project Success

The first category to be analyzed encompasses both the purpose and goal of the project which were stated in the team charter created at the beginning of last semester. Taking an overview of last semester, it could be observed that the team never strayed from our original purpose which was as stated in the team charter, "The purpose of the team is to produce a fully functional standoff mounting arm that will replace the taping method currently implemented at Northrop Grumman". Although we were given alterations to the original project requirements, the purpose was maintained. The goals that were put forward in the same document include producing a product which exceeds the expectations of the customer, and setting a high standard for work quality. In this regard, it can be argued that the team has acquired a high standard of work quality as we have been commended by Northrop Grumman for our progress as well as achieving a high grade in the class component. An area of improvement could be applied to the first goal that was stated which requires that we exceed Northrop Grumman's expectations. Over the course of the project, the team has been given many design considerations ranging from rocket geometry alterations, to multi-bracket attachment heads. While it is still possible to exceed these goals, the team has yet to flesh out the specific details for the given design considerations. Using this information we can make decisions on how to move forward with the project and ensure that the goals we have made will be met. The next section will analyze the project elements regarding the ground rules and coping strategies outlined in the team charter.

The ground rules and coping strategies of the team project are located within the team charter and include corrective and preventative actions tailored towards problems such as punctuality, disagreement, accountability, and team discussion. The purpose of this agreement was to ensure that any disputes within the team had a basis for resolution. The ground rules that most contributed to the success of last semesters assignments includes the standardization of meeting times and locations. With the consideration of each individual team members schedule, meeting times were created and allowed for the proper discussion of project topics, allotment of time to complete any pending deliverables, and the delegation of future tasks. Coping strategies were used to the benefit of the team as a whole as there were never any catastrophic incidents of late work or conflict between team members. These preventative actions served to encounter and then resolve any issues that may have caused distress down the road. While the project ran smoothly last semester there are still areas of improvement that could be made regarding the ground rules. Punctuality was an area that became more neglected as the semester played out. Due to conflicts of managing multiple team projects, classes, and exams, many team members found issue with attending scheduled team meetings on time or alternatively not showing up at

all. Moving forward into the upcoming semester, these problems could be addressed by allowing for more communications between team members preceding a meeting so that there is no confusion regarding the purpose and importance of that meeting. The next section of the project to be analyzed will involve the project performance elements such as time management, product quality, and manufacturing.

The aspects of project performance that were most positive includes the delegation of tasks, product and writing quality. The delegation of tasks allowed each team member to hold about an equal amount of work. By giving each member a specific task to focus on, they were able to produce high quality work by the course's deadlines. The practice of good time management through proper delegation of tasks enabled the team to produce a complete concept for the client. In addition to this, the team also provided him with professional documentation of the product. As a result, the team received feedback from the client which enabled for further improvement on the current state of the design.

As the semester progressed, the team was effective for a number of reasons. For starters, the team distributed the amount of work evenly amongst each other in group settings. At each team meeting, the team would discuss upcoming action items and discuss the best ways to complete them. One way the team did this was by splitting up the project amongst each other in topics each team member specialized in. For example, the team split up the subsystems amongst each other so each team member became the expert in a specific area of the project. This allowed the team to have a person in charge of each part of the device, so that if any design changes needed to be made there would be someone specialized in that area of the project. The use of google docs and slides allowed the team to easily be working on documents at the same time to further increase productivity. The manufacturing lab was also used heavily by the team early on to allow for the creation of small scale testing parts. The team will plan on continuing these methodologies and use of tools moving forward in the project.

A large contributor to the team's success was the advanced training sessions provided by the machine shop staff to aid capstone students. These advanced training sessions greatly helped with the team's technical knowhow moving forward with the project. With each team member being trained on the lathe and the mill, the team has full confidence in building the final prototype for Northrop Grumman. Although the team didn't really use any of the lathe or mill machines for 476C, they will be relied on heavily for the upcoming months of 486C. Additionally, the manufacturing courses provided by NAU are very useful in strengthening the teams technical skills by opening the possibility of welding or CNC machining. Lastly, a few of the team members strengthened their 3D-printing knowledge and abilities by printing various components for the 476C prototypes. Ultimately these technical lessons will all be directly applied to the final build the team will create.

Opportunities/Areas of Improvement

The aspects of project performance that were most negative was communication and the organization of team meetings. While the team did receive high grades on all assignments, issues regarding the productivity of team meetings were still present. Prior to team meetings, all members had an idea of the topics that were going to be discussed based on upcoming deadlines, but there lacked structure. A list of action items should be made prior to the team meeting to ensure that all members are on the same page of what needs to get done. Additionally, there's room for improvement in communication. Any ideas regarding the project should be communicated to the entire team. Increase in productivity can be achieved by communicating effectively and practicing good organizational skills.

While the team did use many tools and methodologies to increase the efficiency of the project, there were also those which created an ineffective use of time and decrease production. One routine that the team fell into heavily last year was showing up late to meetings. Everyone fell into the routine of showing up 5-20 minutes late each meeting, which was not great for production. The team should work on showing up on time or early to each meeting moving forward. The team also had difficulty using google sheets to create spreadsheets for the project. Many times, the team had to have one member of the team create a spreadsheet in excel and import it from excel to sheets so that everyone could see the sheet. This is not very effective as it makes one member get stuck with all the work, while everyone else waits for the completed spreadsheet. The team could try to work with microsoft teams in the future to fix this problem. The team also fell into the practice of not responding to emails and text messages in a timely manner. This should be a top priority for the team moving forward.

Over the course of the last semester, the team was successful in developing the basis for a design that would satisfy the entirety of the customer requirements. While small changes are still necessary to optimize the final product, the development process so far has come without many major setbacks. However, this does not mean that the team was able to avoid problematic situations entirely.

The most prominent issue faced during design was the change of both representation and guidelines after the start of the semester. This led to the alteration of certain design components, as well as completely new considerations. The interpretation of the original project requirements was also an issue, as the individual who wrote them is no longer present at the company. This led to misinterpretation of the requirements and confusion with regard to portions of the design itself, which was all shortly rectified. These problems are still a factor in the ongoing design process, but are all within reason and should not provide too much of a challenge for the team.

The overall quality of work completed by the team thus far has been beyond satisfactory, with no missed deadlines or major shortfalls. However, this does not mean that the organizational structure for the completion of this work was without fault. The timing with which assignments were completed came relatively close to deadlines on multiple occasions, leaving little room for editing purposes. This is a definite point of potential improvement, as earlier completion of assignments would ensure that the editing process returned the best possible final product. Earlier consideration of assignments would also allow for the team to focus more on important tasks, such as presentations, which would provide better communication of design intent.

The organizational structure with regard to dividing up the workload has worked well to date, with early and even splits allowing for each team member to operate with intent. Continuing this, while also attempting to perform tasks further from the respective due dates, will provide a balanced and effective work structure for the team in the coming semester.

Conclusion

As discussed in this report, there are various areas of strength that the team excelled in last year, and other spots where the team could improve. The team as of date has done an excellent job being on schedule with project deadlines, completing work with high remarks by instructors and Northrop Grumman personnel, and adhering to the team charter created in the beginning of the school year. While these are all topics the team should be proud of achieving, there are also areas that the team should look into improving. The team will look to improve staying on topic at team meetings, creating action items to further improve the overall structure of group discussions, show up to meetings on time or early in order to stay professional, respond to

group messages and emails in a timely manner, and begin looking into more ways to exceed expectations in the project. Overall, the team did exceptionally well last semester but each member could improve in various ways before moving on into the career world.