SAE Baja - Team 05
Date: 08/25/2021
Section: 002

Omer Alamoudi
Chujian Wang
Salem Almari
Rashid Algelmod
Musaed Fraidoun

Instructor: Dr.David Willy

Introduction:

This paper explains the postmortem analysis of the project that the team has been working on from capstone I. The project assigned to the team was basically to improve the subsystems of the SAE BAJA vehicle, and the subsystems assigned were brakes, front suspension, and dashboard systems. The project has started from the previous semester (Spring 21), our team has done all the required work for designing the project. And now the team is going to resume its work on the project. In this report, we would like to provide what we have done in ME 476C related to our goals and what issues we decided to change to reach out to the best SAE Baja vehicle in three systems that we are assigned to, which are: brake, front suspension, and dashboard systems. In this paper, the team is going to discuss every aspect of the project according to the goals, rules, performances of team members, and problems they have faced.

Contributors to Project Succeed:

The main reason for the SAE Baja team is to work in an analytical manner as a group. We were assigned by Dr.Willy to develop and improve upon three subsystems to SAE Baja, to have a successful project by the end of capstone II. It is important to follow all the rules that were provided. Also, we trust in ourselves that we can come up with new ideas that are helpful for SAE Baja. It is also imperative that our group creates new suggestions for the car, not only the goals of the team in brakes, front suspension, and dashboard systems since it is an analytical project which means we are able to read more about the project compared to other groups who work in the machine shop at NAU. Also, our team is responsible for analyzing and improving the vehicle and making it more reliable to resist all terrains.

No less important, we stated purposes in the team charter of ME 476C, and they have been achieved by the end of spring 21, which means we followed our team charter in a good manner that led us to reach this step and start thinking about what we need in this semester. On the other hand, our team goal is to perform each work in high quality and to achieve these qualities is to make every work scheduled at a specific time as we do the work early, so every member can revise what other members did to advise him if needed, also to get them done by following the requirements with preventing loss of quality.

Also, every member is free to revise and reanalyze other people's parts. As it is a project, there will be mistakes, but since we follow the schedule that we provided, it will give us a good chance to fix our mistakes and prevent random work to achieve our goal and SAE Baja goals. As a group project, every member should handle a portion of it. We need to provide new ideas, different solutions, and high work, which means we have to make huge efforts to be satisfied with our project by the end of the semester. Also, we work as a group, so each member is able to help others if needed to complete all the portions of the systems that we are assigned to.

The goal is to accomplish the work well with the idea that improves the vehicle's performance. To achieve this goal, we should work hard on the three subsystems which can improve car efficiency. As quality is important, we make sure about it in each step that we did in the last semester, and we still focus on that during this semester.

Project management is a highly structured activity guided by a document that acts as the point of reference. Consequently, the current unit members have sought to observe the rules established in the blueprint in pursuit of a mutual goal as outlined in the charter: There is an expectation for this team that we will regularly meet to discuss the project. Of course, for this to work, each team member is expected to provide a schedule of times that they are available to meet. These meetings will be conducted via MS Team on a certain day that the team needs to determine, so we must create a schedule that fits everybody. Next, it is crucial team members acquiesces to the norms and ground rules for each of these meetings to ensure that they can be done successfully.

As a team, we are expected to meet on Mondays and Fridays at 10 AM, convenient for all team members. Finally, the project manager has outlined ground rules that are crucial in administering over group dynamics. Participants in the project must cooperate to ensure that mutually shared aims are attained. The team engages with other teammates in case of differences in opinion to avoid wasting time and other adverse issues likely to affect project timelines, so voting is crucial to undertaking actions that are binding.

Professional work ethics are crucial to the development of a joint program. In the current project, the team members have agreed to use the MS Team that is used in communication to deliberate on various issues in the program. An analysis of the approach reveals that unit members have agreed to use the platform and have availed themselves of meetings within the stipulated timelines. Additionally, team members are time conscious and observe ground rules as outlined in the charter, which is critical to the success of a program, especially the observance of timelines.

Opportunities/areas for improvement:

The operating environment is dynamic and characterized by numerous challenges that undermine the attainment of stated aims. In the capstone project one, potential barriers were registered that demanded creativity to address. Perhaps, one of the limiting issues in the program was time zone differences since team members are dispersed. Faced with such a limitation, innovative approaches must be developed, including digital communication solutions. As an illustration, a chat group was established that allowed stakeholders to contribute based on their availability. The approach was practical since all ground rules were observed, and the set goals attained as planned. Interested parties must participate in developing a solution to an issue likely to impede the attainment of mutually shared aims.

The positive aspect is that project performance underpins the success or failure of a project since it influences the utilization of resources. With time being a significant constraint, proactive strategies addressed the time zone issue that met all performance administration metrics. Professionally, statistical representation is a vital tool used to enable team members to understand multiple dynamics such as tasks and time allocations. Consequently, a Gantt chart was formulated to outline the required tasks and their projected timelines, which aided in achieving set aims. The postmortem proves that time management was a significant strength of the SAE BAJA since all activities were undertaken within stipulated time frames. Therefore, project managers should reinforce a positive time culture to eliminate the wastage of resources.

Coming to the negative side, quality occupies a central role in product development that requires continuous improvement. Available data from the project shows that quality levels in the scheme were essentially low since several metrics were not attained. By illustration, the project failed to improve the CAD models that are crucial to developing the subsystem designs. Consequently, incorporating lean approaches would result in positive outcomes for the plan and the broader organization, prioritizing the objective during this semester. Regular improvements should be undertaken to eliminate any inconsistencies or underperformance in a structure.

Project development is hinged on multiple tools that automate numerous functions. The software was present with Microsoft tools such as excel, word, team, and Gantt. Further, SolidWorks is another team that was used in the program. Additionally, a decision matrix and Pugh Chart were used in the program since they facilitate the management of the assigned functions. For example, SolidWorks software enabled the CAD design development that would have been challenging to achieve in the prevailing circumstance. Furthermore, documentation is another essential activity that was facilitated through MS Word, resulting in scheme success. Additionally, the Gantt chart was instrumental in task allocation and time management, allowing team members to improve performance. Again, the MS Team was used to provide feedback on various issues touching on the project. Finally, the house of quality is a digital program used to monitor quality in the scheme and offered valuable insights into whether the objective was met. The tool acts as a bridge between the needs of the client and engineering principles. The requirements must be worked to facilitate the attainment of the aim.

In order to improve the performance, the team's work should be organized and take the action of the organization to contribute for the design project, and that will be by the associate of the team. That means the team has to organize their priority, therefore, in this way the project performance can be improved.

The technical lesson the team has learned from Capstone I is that the team scratch the paper before starting to select the design, and that comes after some techniques such as Pugh Chart, Decision matrix, and how to use the HOQ. These kinds of steps are so sustainable, especially before getting started and jumping on the design. The scratch, also, is essential to know how the design will look and what it can be. Moreover, these techniques can contribute and make the design more apparent.

Conclusion:

Project management is a primary activity that enables individuals and organizations to implement programs systematically. The SAE BAJA project is a design improvement plan that aims to improve the functionality of the vehicle. Consequently, three components, including the front and brake, will be redesigned for improved performance. In pursuit of this aim, the institution has formed a team that will be tasked with implementing the scheme. The capstone project possesses multiple objectives, with quality being the most important. However, the attainment of the program is undermined by several constraints, including time differences due to zones. Nonetheless, the project has been automated with tools such as MS Team that facilitate communication among team members. MS word excel are other systems being used to undertake routine actions. Overall, project goals were achieved as outlined in the plan charter. Car model improvement is a technical activity that requires project management to ensure set aims are attained as planned.