Written Report

Group 1 was presented with a challenge, to design and build their own kite. The group went through all the stages of the engineering design process to complete this project. This process started with recognizing the need, then moved on to define the problem, gathered information, generated conceptual ideas, compared, combined and selected ideas, analyzed and designed, fabricated and tested the prototype, and then finally communicated the design.

The first step the group went through was recognizing the need. The need to design and build the kite was the challenge presented to the group by Dr. Gordon. Another need that was presented was an application, what the kite was to be used for and what the market would actually wanted to buy.

During the process of designing and building the kite the group did face many problems but they overcame it all. One of the major problems was how the kite was going to be built. What material would be used, how would it be put together, what kind of kite should be built, and what application this kite would have to be able to perform. After all these questions the feasibility problem also came into play. The group needed a kite they could actually build with materials provided and that was a possibility to do in about a days work. Another problem that came into play was when the kite broke on one of the test flights. This was a problem as the group only had one prototype to test, so it had to be decided how to fix it. These problems were all overcome in the end.

The next step in the engineering design process was to gather information. Each member of the group researched a type of kite that is used in today’s society. Types of kites that were researched were the Box Kite, Diamond Kite, Delta Kite, and the Power Kite. Along with
researching the type of kites that could possibly be made the group also found out what type of applications a kite can do. Some of the applications included meteorology (as in taking the temperature), surveillance using tiny cameras attached to the bottom of the kite (this can be used in the military and other such things that would require it), aerial photography again with a camera attached to the bottom of the kite (this can get pictures from a bird’s eye view or for people taking pictures of the kites themselves), and the last one the group researched was the application for sports (take kitesurfing for example). These ideas were all compiled into a powerpoint presentation which can be found under the letter A on the team’s website.

After the research step it was time to generate conceptual ideas. In this step the sketches of the four kites that were chosen to take a look at were made. Also included was discussing what kind of kites the group really wanted to potentially build and model in a Solidworks assembly. Everyone on the team had a hand in this step.

The next stage was to compare, combine, and select ideas. In this step the team utilized the matrix of design. In the first matrix it was set up so that the type of kites were in the top row and the features that are desired in the kite were listen down the first column. The group went through and labeled between one and five to determine the total, the highest number being the best. Two kites ended up being main contenders were the diamond kite and the delta kite. Then the group set up the second matrix which would determine what each category would be weighted as. Each block was assigned either a one or a zero depending on what factor the group thought was most important. These numbers where then added up and divided by 15. The given percentage was the weighted factor. Another matrix was used with the numbers from the first
one and the new weighted factors. The columns where added up and the winning kite was the simplistic Diamond kite.

The next step was analyzing and designing the kite. The group did free hand sketches to show what we thought it should look like. The group also put numbers in, how long the rods should be, how big the diamond should be, where the string should be put, and even things like should we have a ribbon or not. After the group decided on the dimensions and what the kite was going to look like the kite was built in Solidworks. After this it was time to move to the next step.

It was time to fabricate and test a prototype. To fabricate this kite the group got wooden dowel rods, plastic sheeting, hot glue, and duct tape. There were two main rods that were positioned in the middle and across the kite. There were also four mini rods that were positioned along the outside and attached to the main rods. The mini rods were grounded down until they could be flushed against the main rods. When they were in the correct position they were then all hot glued together. The main rods had divots sanded into them and were taped together. After this the frame was complete so the plastic sheeting was laid overtop and cut into the shape needed. Then duct tape was used to hold down the edges. The strong was attached to both the top and bottom portion of the kite. The kite was now ready for its first testing. The kite was brought to Old Main lawn for testing. It was a sunny day with only a little bit of a breeze. The kite was able to get into the air and therefore it did fly. The only thing was the group had a hard time controlling it and so it would take down turns into the ground but it would stay up in the air. On the last try the end of the kite got caught on a group members shirt and broke in two places, one was on the main rod support rod that went down the middle, it broke nearer to the bottom and
also caused a hole in the plastic. The other break was on the other support rod near the center were the two rods were taped together. To fix this the group taped all breaks and holes, and reinforced the one main support rod with another piece of wood. The kite was brought out onto the lawn again for testing. The group only tested it twice this time and it flew again both times. The first time the one broken rod bent to much which made it come into a crash landing. The second attempt was much better than the first. It flew very well until the string broke and fell to the ground. Overall the kite was able to fly at least a little bit and therefore did its purpose. With better manufacturing the group thinks it would do exactly what it would be designed to do, and that is carrying messages.

The last step in the process was communicating the design. To do this the group made a stand-up presentation that was presented in front of the class. The powerpoint conveyed the groups result that was recorded about the flight of the Diamond kite. It also included a little about how the group built it, what the group would do differently, why they thought it did not work properly, and an error analysis. Finally, it would also include what the kite would be used for in the market.