Mario’s kart

Project Report

Group L6-2

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Title:
Mario’s Kart

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ME1403: Engineering Practice and Design

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Abstract

The idea for this project evolved from the calling of the great outdoors and creating a means to explore it. The purpose of this go kart is to allow adventurists an exciting experience while navigating through terrain that would otherwise be difficult to trek through. With that said, the comfort of the operator was our top priority in the design process. Things that were taken into consideration were the features that other brands of go karts lack, such as a brush guard (front bumper), tough headlight housing components, full cage frame, and durable side skirts. Mario's Kart is a go kart that is designed to be easy to operate, safe, and reliable in terms of its features which are built to endure the abuse of the outdoors.

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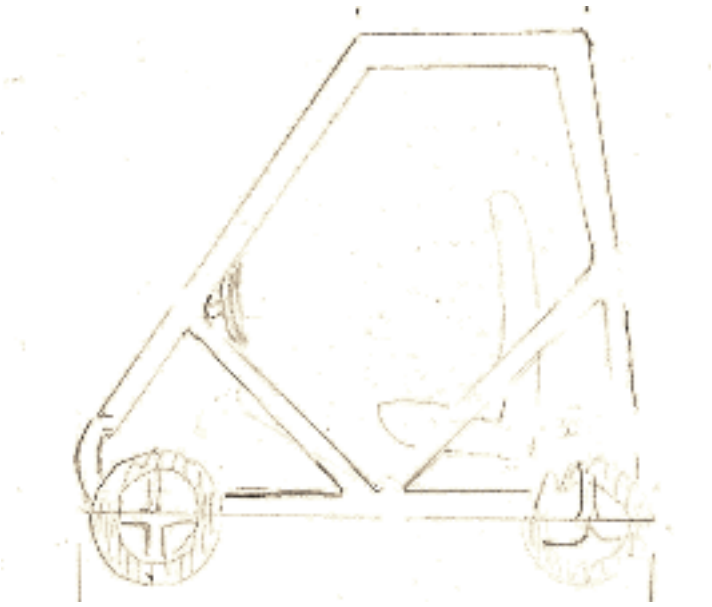
Ch. 1 Introduction

1.0 Introduction

The Project requirements consisted of producing a go-kart that is easy to operate, affordable and reliable. Keeping in mind that it is intended for use off of the beaten path we designed a go kart that redefines it altogether.

1.1 Problem Formulation

A challenge that presented itself quite often was the fitment of the parts to one another. So, often times we had to go back and edit previously completed parts to mitigate the room for error in throughout the assembly process.



1.2 Concept Design

As outlined in the initial submission the original idea was for the most part a basic street go-kart. However, in order to separate our design from that of the competitors we went back to the drawing board time and time again to improve on the original concept. The change which really directed us to a more specific audience was the implementation of rugged parts.

1.3 Configuration Design

Overview of the final design is consistent in providing the necessary amenities for an off road enthusiast. Throughout the kart you will notice the details that aim to be fully functional, aesthetic parts. Painting only some of the parts rather than the whole thing was based on the decision to maintain the raw look of the kart. In addition to a visibility flag that is mounted to the rear of the kart, we decided to add a windshield along with a windshield wiper.

1.4 Solidworks

The program used to create the parts for our design is Solidworks. It essentially enabled our team to put our ideas into actual three dimensional objects on the program interface. Through the use of different features such as extrude, extrude cut, revolve, chamfer, and fillet, the design team was able to create and manipulate specific parts of the kart.

Ch. 2: Methodology

The difficulties throughout all Methodology sections were similar. They mostly consisted of dimensioning and making the parts look cohesive. After designing the parts the way each of us imagined we then had to figure out how they were going to be attached to the other parts. Not only in figuring out what to add to attach parts but figuring out exactly how to transfer our hand drawn ideas onto SolidWorks. It was a challenge to figure out the right commands needed to create the features we wanted. It took trial and error to get the dimensions right in the final assembly to properly mate every part.

2.1 Week 1

- Pedals: The difficulties in designing the pedals were mostly in creating the thread at the end where they would screw into place. Difficulties also came up when constructing the edges.
- Frame: Dimensioning the thickness of the pipes correctly without losing the set length and width from the drawing.
- Headlights: Figuring out the right dimensions for the headlights.
- Flag: Designing the mushroom logo to pop out from the flag.

2.2 Week 2

- Steering wheel: Fillets along the inside of the steering wheel.
- Engine: Forming the shell of the gas tank.
- Wheels: No challenge was faced with wheels.
- Tires: No true challenge presented.

2.3 Week 3

- Front bumper: Trouble making it not appear boxed out when extruding. Difficulty achieving a curved look with fillets.
- Exhaust: A challenge faced designing part was creating proper tubes from the main body.
- Steering column: Figuring out how the part would be attached to the wheels and having enough clearance around the frame.
- Windshield: No challenges presented.

2.4 Week 4

- Back bumper: Difficulty making each pipe connect with just one sketch. Had to create several sketches. Had trouble making fillets to combine them.
- Side panels: Off setting the radius of the tires in the sketch.
- Drive axle: A challenge faced when designing the drive axle was being able to get a revolved base from the imaginary line.
- Seat: getting the right contours to make it look like a seat. While maintaining life-like dimensions.

2.5 Week 5

- Struts: Figuring out how they would attach the axle to the frame, and at what point.
- Brakes/Rotors: Building a gear.
- Wipers: A challenge when designing the wipers were getting the curve shape to attach from the main body.
- Floor panel: No challenges.

2.6 Week 6 Final Assembly

In the assembly process the issue that was prevalent for most of the parts was that we as a group hadn't initially thought up of a way of how each of the components would perfectly fit with each other and mate along with the frame. An example of this would be the flag mount. The originally submitted flag mount did include a bracket but when it came to joining it to the frame we had a bit of trouble mating it. In order to fix the mate issue we edited the mount to include a wrap around type of bracket.

Ch. 3: Analysis

3.1 Parametric Design

In the parametric design, the group noticed that a couple parts were either too small or too big. We eventually, had to go back to the first drawings and change the design/dimensions of more than 5 parts of our design. The reason many parts were not the right dimension was because each individual worked on the parts separately and this caused the re-dimensioning. Another reason we redesign the parts at the end, was to make it easier for us to mate and assemble parts to reduced time spending and focus on other issues. One part that had to be re-dimension was the Axe-handle to a smaller scale to be able to connect not only the frame but also the Exhaust and both wheels and tires. Another part that influenced the successfulness of our project was going back and changing the floorboard design and adding holes to be able to mate the seat in a proper position without it moving. The floorboard not only was re-design to connect the seat but also to place both the left and right pedals in a proper way. Both the front and back bumpers had the correct dimension but there was no way of been able to mate or connect the bumpers with the frames so the group came with an idea of changing the design and creating different bumper brackets to be able to mate the bumpers with the frame.

3.2 Detail Design

In the final design, we successfully were able to include each of our individuals parts that we had planned and sketched in the beginning of the project. When we began to assemble and mate the Mario's Go Kart, we faced a couple of obstacles where we eventually had to go back to our first parts drawings and change the design and dimensions to be able to make some parts go along with the rest of the assembly. After we redesigned the parts, it made the mating easier to mate and get a proper Go Kart. At the end of the design, the Mario's Go Kart consisted of

(Blank) parts where some parts were replicated for example the wheels, tires and headlights to make the final design a successful project.

Ch. 4: Discussion and Results

4.1 What went well?

Team L6-2 came to a quick consensus to model a go kart in solidworks and got off to a great start. In the first steps of the project the group was diligent while designing each part and creating drawings to show how the part was constructed. Everyone got along well and mostly followed the schedule of deliverables. There were 20 different parts to assemble in order to build the go kart. The members worked together to complete the assembly and did not leave it to a single person. Team L6-2 produced a safe and reliable go kart that outdoorsmen and women will find easy to operate and fun to ride.

4.2 What did not go well?

The group faced many challenges throughout the assignment. When it came to assemble all 20 parts it was apparent that the task ahead would prove to be difficult. Mating the parts to a cylindrical frame bars was hard because a standard coincident mate would result in an overlap. Multiple tangent mates were made to accommodate the circular surface. The cylindrical frame was apart of the original design because it is stronger than a rectangular one. The group did not work together during the lab because the computers continuously froze and crashed.

4.3 What could have been done better?

Parts that directly attached to the frame could have been made to fit the circular surface. This would have saved time during assembly. To make the go kart more aesthetic the group could have rounded off some of the corners with fillets. Also a more colorful vehicle could

attract more customers. The front bumper was modeled at the last minute and could use some more work.

Ch. 5: Conclusion

In conclusion, Mario’s Kart offers a plethora of options as far as preferred customer color choice and light placement. Despite its boxy appearance, our team holds true pride in the final product because it is the unique design that makes it a dominant force to when compared to all the possible ways that it can be put to the test. Be it the daily work abuse on a ranch in South Texas or the recreational use in the Rocky mountains know that Mario’s Kart will prove itself time and time again.

Bibliography:

1. Solidworks by Sham Tickoo
2. https://kartfab.com/live-axle-go-kart-plans