Website Analysis

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Project website

Introduction

Websites have become one of the easiest ways of passing and dissemination of information where there is a group that is involved. It cuts down on the communication time and the resources that are needed to make the communication a success. The other thing is that websites are a good way of reaching to other people of which one have a need to make contact. We are undertaking a project on Go Baby Go. In undertaking our project, we are a team that works together as well as individual exploits. However, we all needed to keep an update of what we are doing and communicate with the rest of the members of the group. In our project, we decided, to make a website that would help us to complete our project successfully. Since it is expensive to buy a website we decided to make a website ourselves.

Making of the website

We made the website with software that is called Adobe Dreamweaver CS6. The Adobe Dreamweaver is one of the best sites for making a website. First of all, it is free to use this software to use this website. As students, we did not have the money to pay someone to make us a website that will cost us a lot of money. The other thing is that this software is very easy to use. The software has an inter-phase that holds many templates. One can choose any of these templates and build on them to make the website that they so desire. One does not have to be a computer wizard to use this software. We customized the template that we choose and added the features that we found were important for our site.

Effective websites

One of the most important features of a website is that it should have a computer and a mobile inter-phase. Most of the people these days are using their mobile phones to browse the internet. It is therefore important to have an inter-phase that can be operated by the computer and phones to make it accessible to all people.

The second feature is that it should be light. Generally, the websites are accessed with the use of internet bundles. If we have very heavy websites, they will take a long time for them to load and also use a lot of internet bundles. Use of heavy pictures and videos is one of the things that make a website to become excessively high.

The third requirement is to have a one reach inter phase. This is a situation where one can reach all the parts of the website from one page that one is in. This is the ability to get to all the website section from the home page or to all the other pages from any of the pages. The ease of navigation through a website is important so as to make the browser o be quick and to have a comprehensive reading of information in a website.

Website functions

One of the functions that will be played by the website is that there it will be used to update the progress of the project. Each of the team members has their parts that they play in the project. Sometimes, these parts are done independently and the team members will upload their progress on the website sooner after for the other team members to update themselves. The site

will also be used as the communication channel for the team and people that who care about the project. When the officials want to pass information to the team, they will upload it to the site and then the team and everyone will be able to access the information that has been uploaded and see it online.

The other function that will be played by the site is that of views giving and contribution making. There will be materials and prototypes that will be uploaded to this site. The team members will then be asked to make contribution opinions on the materials that will be uploaded to the site. From the contributions that will be made, the individuals that are responsible for the areas that needs to be changed will then make the changes that needs to be made. The other function that will be played by the site is that of sponsorship in terms of resources and knowledge. We need resources that will be used to make this project a success. We may be able to meet the basics but if we got some outside assistance in resources. We will be able to make an even better device for the children. We also need technical assistance from people who have knowledge that may be of benefit to the project. To be able to reach these people who have the knowledge and the resources, we will direct them to the website.

Web inter-phase

The website was made simple since our purpose was fairly simple and straightforward. Once one got into the site, the first thing to see is the most current update form the group. Whatever a post is made, it goes to the news column and anyone in the group can be able to see it at the top of the stack of the posts that are made recently. These appear in a sequence that is based on how recent the posts have been made. On the menu of the site, we have the columns for the home, members, contacts, prototype and news. The home page has information about the

project, why we are doing it, the rules that are needed for the project and a timeline of the execution of the project. The members' page has information about the members of the team. This includes their characters and the contributions that they are responsible for. The contacts section contains information about how to get into contact with the team in case one has a contribution that they want to make to the project progress. The prototype section will have details about the materials that will be used, the modeling of the baby go baby car and the dimensions. Finally, the news section will be the one that will be on the pop up once one gets into the site.

Conclusion

The website that we have model is supposed to help us to successfully complete our project, garner as many resources as possible that will help make the project a success and also act as a communication power house for the team. The model that we have made is simple in it's inter phase and one can be able to easily navigate the site easily. The site make up allows for the multiple numbers of people to have ability to post on the site. This is important as it will help all the members of the team to make their updates and contributions to the site all the time. Finally, this site will be part of the information center for the group.

Safety Analysis

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Components and Structural Safety of the Ride-On Baby Jeep Car

Ride-on baby Jeep Car is built in a comfortable design that can suit children with disability. It uses a cross harness seatbelt to provide support for the child's back. It has comfortable seat design that can be adjusted to suit the physique of the child. The comfort makes it likable by a child that uses it. It has improved controls with smooth designs for the safety of the child. The child can operate it while seated in a safe manner that protects potential injuries when using the toy.

Among the key design structure for the Ride-on Jeep Car include a wider base covered by the wheels. This works alongside a central positioning of the rider's seat to provide some centrifugal balance. The rider cannot fall off and be injured due to centrally balanced design. Instances of rollover become increasingly difficult unless an adult who has a higher center of gravity decides to board the Ride-on baby Jeep Car. This instance is rarely possible because the limbs of an adult can hardly fit into the space holding the seat for the driver.

The tires are also wide enough to prevent ground slip off. The seat should be designed in an adjustable model for flexibility. Different kids have varying physiques and body sizes. Some have longer limbs that require more space between the steering wheel and the seat. Others may also be too short, maybe due to a younger age, making them unable to reach the steering wheel. A rigid seat would be uncomfortable for such kids.

The design meets customer requirements, as it lacks sharp corners of edges that could jeopardize child safety. It's slower acceleration speed makes it safe for use by children.

The PVC pipes that make the framework have a maximum tensile force of 100N. This is the maximum force for them to crush and make the kid unsafe. We need to use this to calculate the maximum speed that the car should attain and the child to be safe.

$F = 1/2MV$^2.

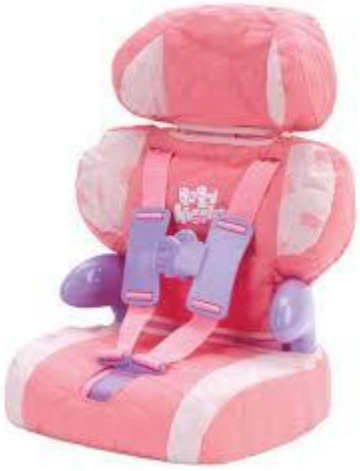
100= 1/2MV^2

100 =0.5x50xV^2

V^2 = √(4)

= 2km/hr

The car should not be designed to have a speed that is greater than 2km/hr for the safety sake of the child in case there is crush against a wall. It should however be made sure that the child is strapped to a seat with a seat belt like the one shown below



Baby car seat belt

The overall weight of the Ride-on baby Jeep Car is below 130lb. This means that it can easily be pushed if it breaks down. It also does minimal harm when it runs over materials of

body parts of children. This improves the children's safety. The weight also ensures the stability of the toy, making it safe for children to climb on top of them.

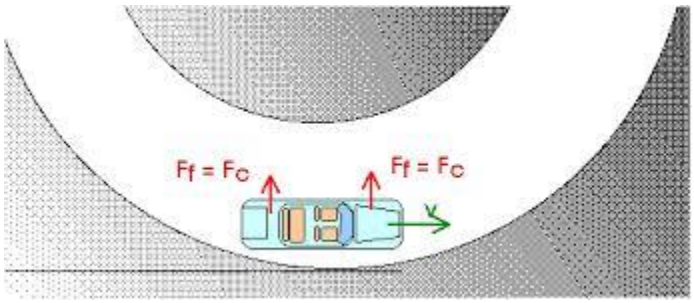
One of the important safety issues is safety when making corners. The total weight of the child and the car will most likely come to 50kg. The mist critical corner that the child can negotiate would be 1 meter in radius. This force at a maximum speed will yield

Fc=MV^2/r

= 50x 2X2/1

= 200N

Every time taking a corner at maximum speed, there will be a centripetal force of 200N. To prevent a slip up of the car on a flat area, we need;



Force around corners of the baby car

Ff= ЧFc

200= Ч* 500N

Ч= 200/500

Ч= 0.4

Any coefficient that is less than 0.1 is dangerous. We have 0.4 which is greater than 0.1. This means that at top speed, the baby can make a curve and would still not skid off the road and hence safe.

In the event that the child rider slips off the Ride-on baby Jeep Car, their safety can be secured through guard bars made with PVC pipes that run around the entire car frame. This creates some sort of a roll cage that prevents the child on board from slipping off the car, for instance, if they hit an obstacle. Other than this, the seat has a harness belt that the child can pull and strap on before they ride the baby Jeep Car. This is a redundant design for safety, as children may often fail to see the risk in riding their toy car.

Very few children may actually remember to put the strap on, as most see the Ride – on baby Jeep Car as a form of entertainment and recreation, not harm. For this reason, the PVC roll cage would have to provide safety to the child on the baby Jeep Car without requiring their input or discretion. The fact that the child has much control on the Ride-on baby Jeep Car's acceleration makes it safe for use by children. They can choose when to increase acceleration and when to reduce it. For instance, they can avoid hitting obstacles because they can easily decelerate the Ride-on baby Jeep Car.

Steering Wheel

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The ride-on-car is a very important device that is used by people from all around the world. It has the perfect shape and design formula that makes it one of the best ways for a child to travel and move around. This is one of the best ways in which issues facing the use of reliable materials for the manufacture of such a very important device can be effectively realized.

The ride-on-car making is a project that utilizes the most effective light materials that include tough wheels that do not disappoint. The variables involved in the performance of this design structure include a great deal of physic input that can be relied on for posterity purposes. Other elements can include circuit, dynamics, and efficiency. One of the ideas that the team came up with is replacing the steering wheel system for the jeep car and placing a joystick. The joystick is very efficient in the delivery that takes control of the car. The joystick acts as a proficient way of offering control and direction of the car thus making it useful for a lot of children. The system is perfectly designed in order to capture the variables involved in determining the direction and stability of the main ride-on-car. The ride-on-car steering system uses calibration and gives the speed with careful amount of precision.

Due to the steering features in the ride-on-car, the composite will be slightly different than a normal car. This ride-on-car is going to be supported with a 12 V battery. With it being an electric car, the car will be based on a circuit board. A way to look at the steering system to work is to look for the safeness that can be the most important aspect of the steering wheel. For example, if the car is set to its highest speed; which is 8 Km/h, the angle of the steering wheel must be turned approximately and constantly. This ride-on-car can turn to approximately 10 revolutions due to the equation below[1].

$$R = vmax * dof\ wheel * \frac{1}{28(pi)}$$

$$R = 88\left(\frac{in}{s}\right) * 10in * \frac{1}{28(pi)}$$

$$R = 10.004\ in/s$$

[1] "Revolutions per minute," in Wikipedia, Wikimedia Foundation, 2016. [Online]. Available: https://en.wikipedia.org/wiki/Revolutions_per_minute. Accessed: Nov. 19, 2016.

The steering wheel will be connected with a window motor Am-2235 shown below. This motor is for a 12 V input, weights 1.11 pounds, a current of 5 amps, gives a torque of 70 in-lb, and gives off a maximum power of 200 Watts.

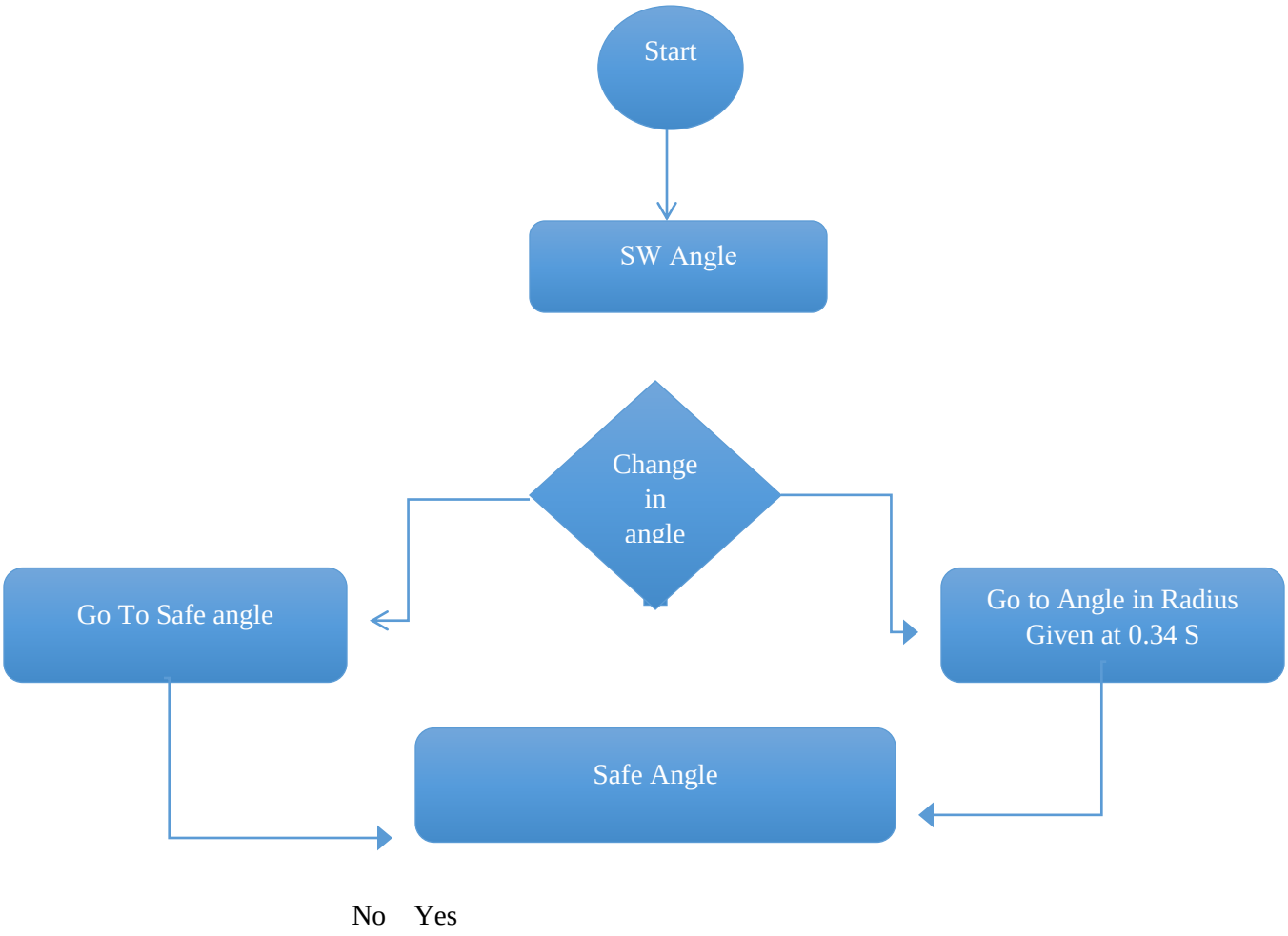
Figure 1 Am-2235

The turning angle will be connected to the Am-2235 motor. This motor will be connected to the circuit board by having the connections parallel to give the car its maximum speed. With the motor connected to the steer motor angle, the steer motor angle will give the function to the Arduino, which will be the brains of the system. This system is going to be the safety system. For example, if the child is on maximum speed and turns the steering wheel into a wrong angle, the Arduino, which is connected to the steering wheel system, can give the code to the steering wheel's brain, to do it but in a slower motion and safely. This can give the child a more safe and stable vibe while in the ride-on-car.

An equation below can be a simple way to sow how the turning angle, steering motor angle, Arduino, and the steering wheel angle are connected.

$$Tangle = Cconstant(SM\ Angle)$$

The Arduino can be given in a Soto code for an angle configuration. When the Arduino is placed in a diagram it could be an easier task for a startup setup. A startup diagram can be shown below.



From the diagram above, it shows an easy step procedure that when a child starts to turn the steering wheel in the right angle that will be calculated, it will do so within 0.34s for the turn. On the other hand, when the child turns in an angle that will be a result of its falling or tipping over, the Arduino will set itself to go to the nearest and safest angle that a child should be turning. With both cases, the turns will result into a safe angle turn. The safe angles of the steering could be calculated using forces with summing up the forces in the Y and X-axis. An equation that could be used is shown below[2].

$$angle = Atan^{-1}\left(\frac{Wheel\ base}{turning\ circle - car\ width}\right)$$

Another idea that the team came up with is replacing the steering system for the jeep car with a big dome push button. This 12 V button can be adjusted on the parent's specification, which can allow the button to a lower profile. This button is a new tick for a child to handle. This button offers an excellent performance while operating. This button can help a child push and accelerate the ride-on-car.

Figure 2 Push Button

Conclusion:

The steering wheel is one the most important aspect within a ride-on-car, due to it being the brains and the operating object that allows the ride-on-car to work. Without the steering wheel, the ride-on-car will just have an acceleration and deceleration, and will not have a proper contribution to the children riding the ride-on-car. To be safe the Arduino is one the tools that might be used to form a code that will help stabilize the child's safety. The code will need different calculations and angle configurations to help ease

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[2] "Typical maximum steering angle of a real car," 2016. [Online]. Available:

http://gamedev.stackexchange.com/questions/50022/typical-maximum-steering-angle-of-a-real-car. Accessed: Nov. 19, 2016.

the process. Within the equations, the angles that will be safest for a child not to tip over the ride-on-car, needs to be found out, and place within the Soto Code.

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Calculation at Maximum Speed

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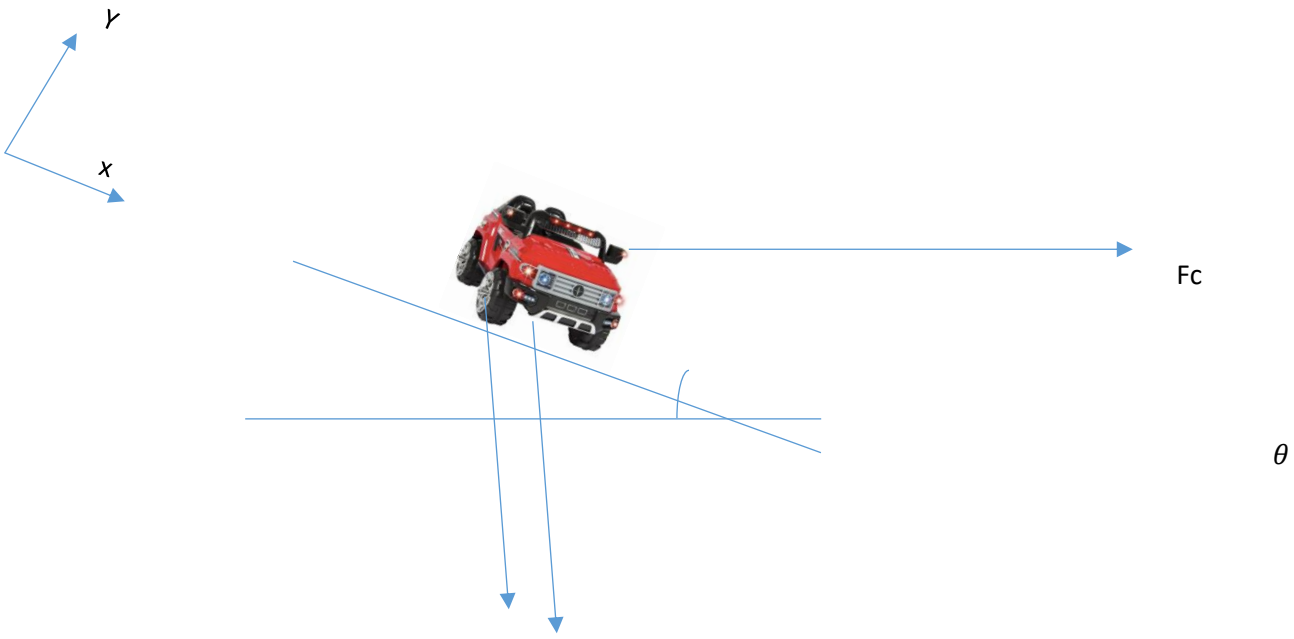
A scenario that some might think about when a child rides a ride-on-car is that what if the child is on a slope, or is turning within a curve, what will happen, and what is the angle that will be its maximum before it tips over. The most important thing that parent wants for a child is to be safe, no matter where, or what the child is on, safety is what a parent looks for in any object the parents buys for a child, especially if the child needs help, or has difficulty to move around.



In the schematic above, is a theoretically scenario, where the car is going towards this page, with the X and y co-ordinates. The components will be divided up into two sums in the forces of Y and X shown in the equations below.

$$\Xi Fy = N + Fc * sin\theta - W * cos\theta$$

$$\Xi Fx = Fc * cos\theta + W * sin\theta - \mu N$$

N= Normal Force

Fc= Gravitational Force $Fc = m * (\frac{v^2}{r})$

R=radius of path

V=speed

M=58.967

W= 58.967*9.81= 578.46627

$\mu =$ Coefficient of Friction

To find the coefficient of friction is in the equation below:

$$F = \mu * N$$

Within this ride-on-car the maximum speed is going to be 8Km/h, and when converting it will be giving us 2.22222 m/s

For the centripetal acceleration it must be a net force and a net force always causes an acceleration in the direction of the net force. As for the centripetal force is a force that causes motion in a curved path. This is provided in the equation above. This circular path acts towards the axis of rotation.[3] Another way to figure out the gravitational force is by looking at the angular velocity which tends to help when figuring an angle. An equation is shown below.

$$Fc = m * r * \omega^2$$

$\omega = angular\ velocity$

Conclusion:

While equations and summing up information and directions are the benefits of figuring out how fast and how steep a child could go, and be safe at the same way. Using the banked turn equations are very prices, but with the help of the centripetal acceleration and force, also helps out to figure the out the angles. With those information, the parents will have a background on how their child could be safe and why.

3

Reference:

[1] Boundless. “Centripetal Force.” Boundless Physics. Boundless, 26 May. 2016. Retrieved 19 Nov. 2016 from https://www.boundless.com/physics/textbooks/boundless-physics-textbook/uniform-circular-motion-and-gravitation-5/velocity-acceleration-and-force-53/centripetal-force-258-4350/

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Acceleration Component

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DISCLAIMER

This report was prepared by students as part of a university course requirement. While considerable effort has been put into the project, it is not the work of licensed engineers and has not undergone the extensive verification that is common in the profession. The information, data, conclusions, and content of this report should not be relied on or utilized without thorough, independent testing and verification. University faculty members may have been associated with this project as advisors, sponsors, or course instructors, but as such they are not responsible for the accuracy of results or conclusions.

INTRODUCTION

In the following report, it discusses an analysis of the acceleration component for the Go-Baby-Go (GBG) capstone project. In previous GBG project vehicles, there has been an occurring issue of a “jerking” motion when a child presses the accelerator because the only speed control setting on the vehicles are stop and go. The “jerking” motion causes the children to be startled each time they drive the vehicles. The team chose this issue for focus on as a top design component to retrofit the Barbie jeep. The issue is addressed in the project by regulating the voltage power output from the battery to the drivetrain of the vehicle.

IDEAL MOTOR ACCELERATION

For the adjustment of a “smooth” acceleration, the team ensured that the motor output torque is greater than the mechanical load torque. The “acceleration time is important to avoid over-heating the motor due to the high starting currents” [1]. The following graph displays the ideal acceleration relationship between the torque and speed of the AC induction motor:

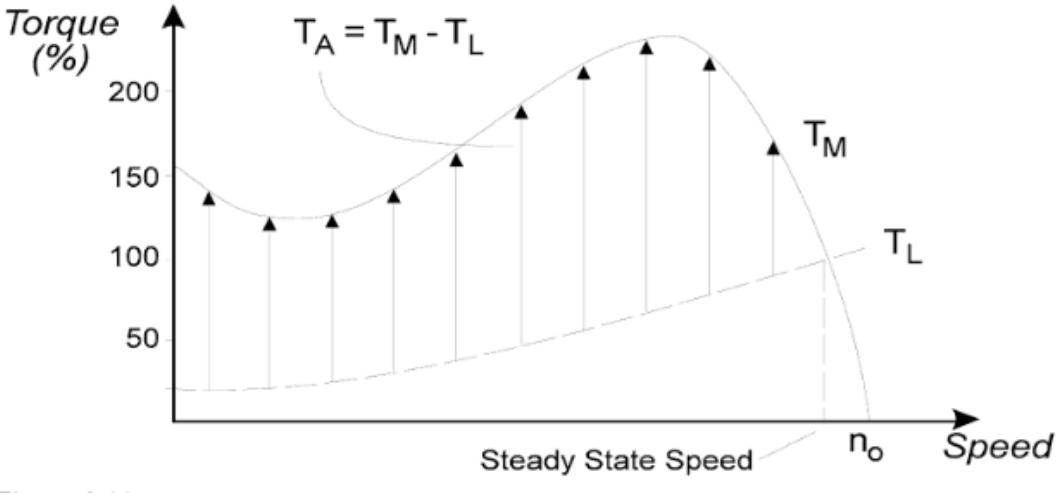

Figure 1: Acceleration torque at steady state speed [1]

Where:

- T_A is the torque acceleration
- T_M is the motor torque
- T_L is the load torque

Another consideration in dealing with acceleration is the rate of acceleration of the system moving:

$$T_A = J \frac{d\omega}{dt} \quad \text{Nm}$$

Equation 1: Rate of acceleration of the system [1]

Where:

- J is the Inertia of the system
- w is the Rotational speed

The rate calculated needs to be constant throughout the time the system is moving until the maximum speed is reached. It takes the inertia and differentiates it between the rotational speed over time.

The following graph displays an ideal velocity over time with a gradual acceleration:

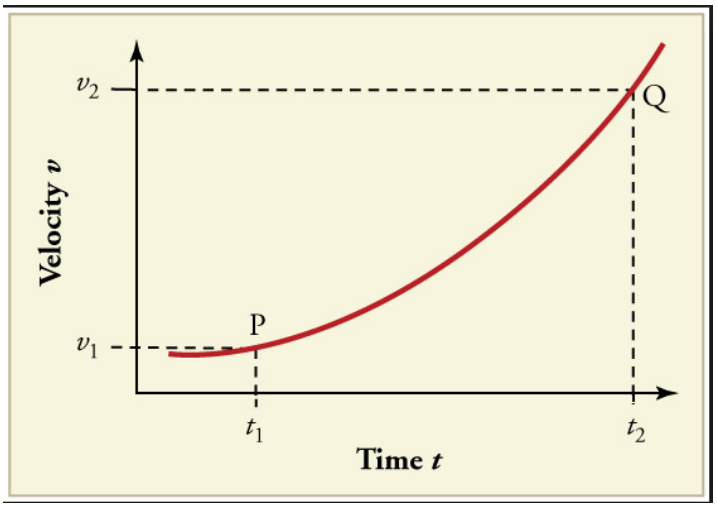

Figure 2: Ideal velocity over time graph with constant acceleration [2]

ROTARY POTENTIOMETER

A rotary potentiometer is used as another resistor in the circuit, in which it will control the amount of current that is delivered from the battery to the motor. The orientation of the knob determines the amount of resistance applied to the current [3]. Depending on the number of terminals, it will be either an adjustable voltage divider or variable resistor. It will be attached to the stock battery and adjusted accordingly in resulting for a “smooth” acceleration.

Figure 2: Rotary Potentiometer [4]

The associated equation for an ideal voltage divider to determine the amount of voltage that the new circuit outs is as follows:

$$V_{out} = V_{in} \cdot \frac{R_2}{R_1 + R_2}$$

Equation 2: Voltage out [5]

Where:

-V_{Out}: Voltage out of the system
-V_{in}: Voltage in the system
-$R_{1/2}$: Resistance of resistor 1 and resistor 2

The battery voltage of the vehicle is V_{In}, the potentiometer and additional resistors in the vehicle are R_1 and R_2, and the output voltage transferred out of the motors is V_{out}.

VARIABLE SPEED ACCELERATION

The switch from a power drill will be applied to the acceleration throttle of the vehicle because it is the most effective unit for variable speed acceleration. As one gradually applies pressure to the switch, there is an increase in current from the battery which will allow for a constant acceleration and eliminate the “jerking” motion. The following is an example of the switch:

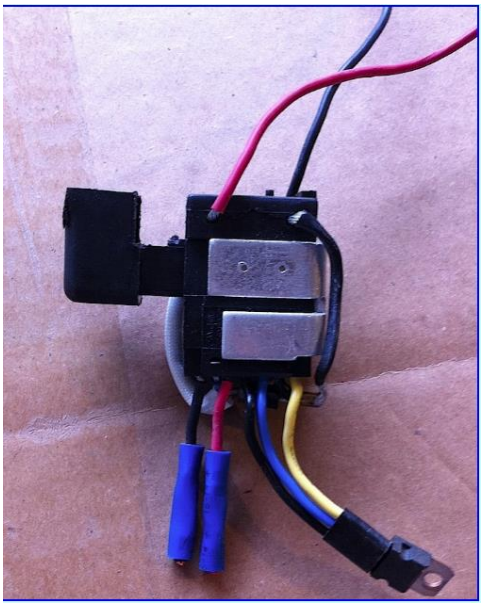

Figure 3: Power drill switch [6]

CONCLUSION

The team found a solution to address the “jerking” acceleration issue with the Powerwheel vehicles that startle children users. The use of a rotary potentiometer is part of the solution design because it will control the current output. A variable speed acceleration of a powerdrill switch is also included in the design because it is an existing product that fully displays the concept of our solution.

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