

MYP:Personal Project

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Main rules.

Start: October 01 2015

End: February 19 2016

Language: English

Criterias are more important than product.

Supervisor: Barannykov Artem Anatolyevich

Theme: Investigating technical features of 4ws and the benefits of it's use in practice.

Goal: Investigate advantages and disadvantages of 4ws technology.

Tasks:

- 1. Learn history of 4 ws.**
- 2. Investigate technologies of 4 ws.**
- 3. Learn the experience of assembling the car.**
- 4. Create my own technology of 4wheel steering.**
- 5. To discuss with father and supervisor my technologies of 4ws that I want to realize in my car model.**
- 6. Make a car with 4ws.**
- 7. To test my car.**

Global context - science and technology innovations.

- Criteria:**
- 1. Investigate**
 - 2. Planning**
 - 3. Taking action**
 - 4. Reflecting**

Investigating

My project is about 4 wheel steering. It has a lot of advantages and disadvantages and my goal is to investigate advantages and disadvantages of 4 ws.

Toyota is first company who created it for usually cars but soon they stopped using it so my. Why they don't want to use it anymore?

If I learn advantages and disadvantages of 4 ws I'll know why Toyota stopped using it. My global context is science and technology innovations. I choose this global context because I'm interesting in auto engineer and auto design. I started car modeling earlier so I will My hobby and my project.

Also I choose this theme because my favorite school subjects is physic and mathematic. I have good marks, its interesting for me and I understand it faster than others. I think this subjects are important for me and my project because auto construction consider physic math and little bit chemist.

For learning pluses and minuses of 4 wheel steering I start from searching information about it.

13.10.15 I start my project. I start to find teacher for my project and theme.
16.10.15 - I choose theme but I don't have supervisor. - Theme: Advantages and Disadvantages of 4ws.
23.10.15 - I found supervisor: Barannykov Artem
15.11.15 - I start to think about technology of 4WS
25.11.15. - I bought my r/c car for my project with discount because today is blackfriday.
26.11.15 - I start to drive r/c car.
30.11.15 - I create technology no1.
02.12.15 - I discuss technology no1 with my teacher. - We found minuses of technology no1.(It's too hard to realize)
03.12.15 I create technology no2, I discussed it with teacher. Result: it's good technology, we will use it.
05.12.15 - I start to learn story of 4WS - Toyota created it in 1972. I change theme of my project. I make project about minuses and pluses of 4ws.
06.12.15 I knew that Honda, Nissan and other Japanese auto companies made their own 4ws, but After Toyota.
07.12.15 Today I knew that first 4 ws was created by Mercedes-Benz in 1931. I didn't find information about the man or the team.
08.12.15
12.12.15 - I start to learn how to set 4WS on my car.
15.12.15 - I decided to call to service center of my car, to learn about 4WS setting.
20.12.15 - I wrote first criteria - Investigation
21.12.15 I create technology no3. I'll discus it with my teacher, I think it's easier then no2.
22.12.15 - I start to make sketch of car with 4ws
A25.12.15 - I'm finding details for car.
I need: 02014(2), 02015(2), 02025E(2), 02074, 10391(14 см), 03013, 02075,02012(2), 02030(-),02016,03015,02038(8) 2 штыка, 4 по 1см шестеренки.
Шасси на 3см длиннее.

Слов: 710

Source was Internet(wed pages about history of auto constructing). I found that It was created in Japan by Toyota. There is no info about the man or team who created it. 4 wheel steering was created because in Japan live a lot of people band roads was small and it was hard to park in city so they create it to make parking easier than before. Nowadays technical developed deep and we can make 4 ws using programming and computers to synchronize front wheels with rear. But in 1970(when it was created) computer wasn't develop so good and they had to make it using just mechanical methods. While I was finding info about 4ws, I found that

4ws has been just in Japanese cars. I don't know what is the cause of it but, I analyzed Japanese auto companies, German auto companies and other, I think that other companies refused from this system because they wanted to add other things that was more important. 4ws is easy to make, but it takes a lot of place in car. Also I found that Mercedes-Benz created car for German army with 4ws in 1937. Mercedes's car was smaller than usually cars and making 4ws on it wouldn't be hard.

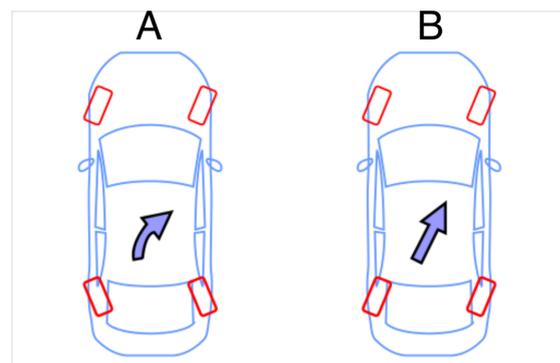
Technologies that were created before.

First technology. Toyota.1980.

Toyota used mechanical method to make 4ws. But they don't make it in mass production.

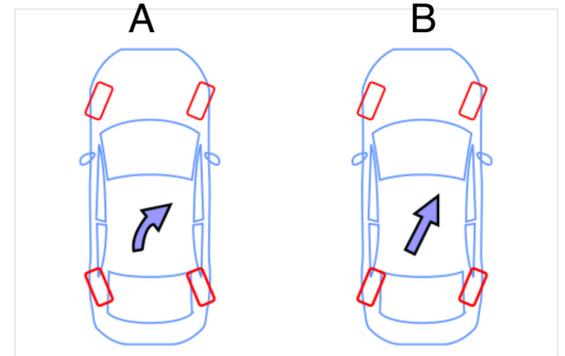
<10 km/h - A

10 < km/h - B

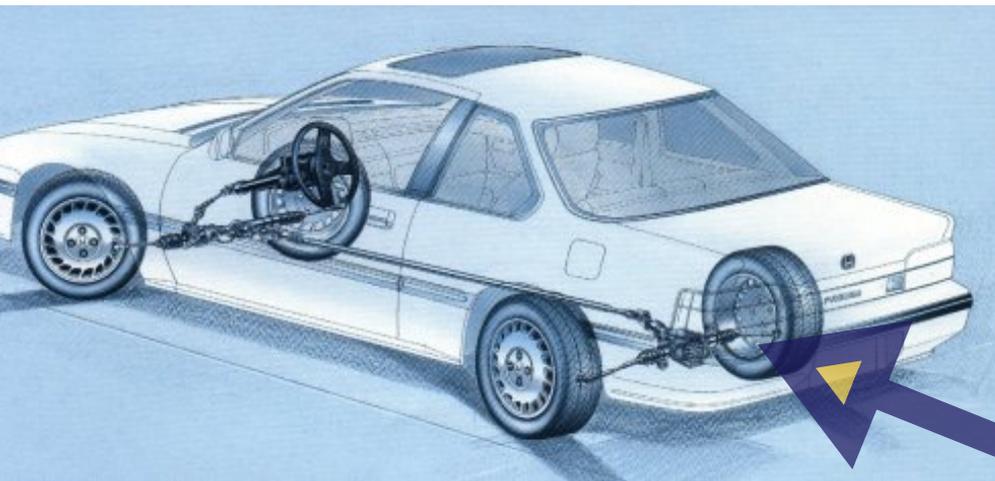


Second technology. Honda. 1982. Hondas technology was the same that Toyota but it was modified. Honda Prelude in 1982 had official 4ws tuning(addition feature) but it wasn't included in car.

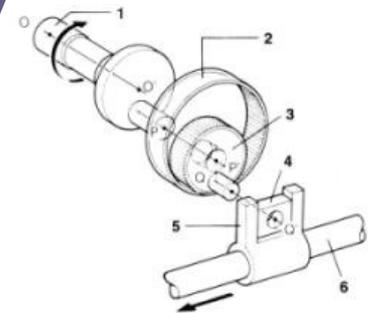
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On the photo. Honda Prelude with 4ws technology



1 — input shaft and disc eccentric; 2 — planetary gear with internal gearing; 3 — gear internal meshing with the output eccentric shaft; 4 — the sliding liner; 5 — guide; 6 — steering draught.

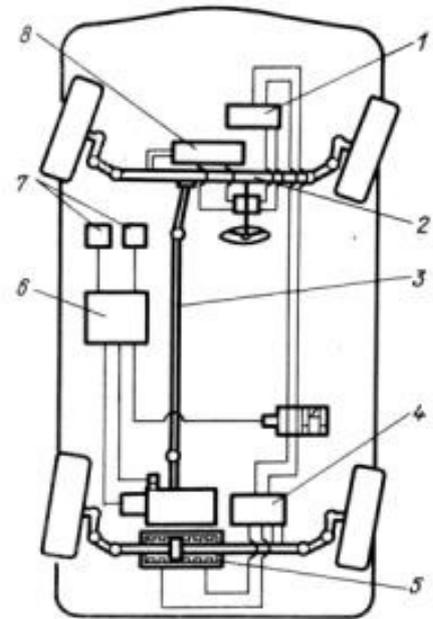


Third technology. Mazda. 1985.

Mazda is the first company that uses computer technology in 4 ws. Rear wheels was turning by electro-hydraulic pump. It wasn't turning of but 4 ws type was changing by speed controller.

Fourth technology. Nissan.HICAS. 1992.

1 — hydraulic pump; 2 — a steering mechanism turning front wheels; 3 — transmission shaft to the rear wheels; 4 — control valves of hydraulic system; 5 — a steering mechanism turning rear wheels; 6 — electronic control unit; 7 — sensors speed; 8 — hydraulic accumulator.

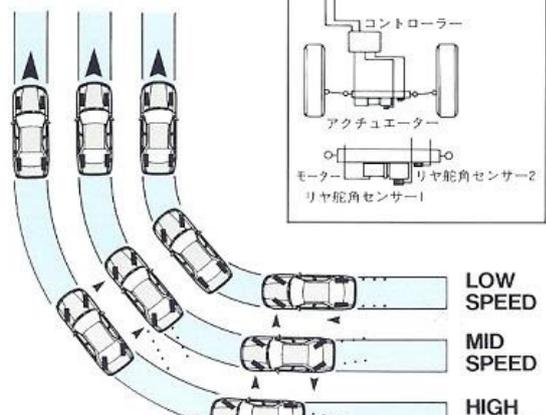
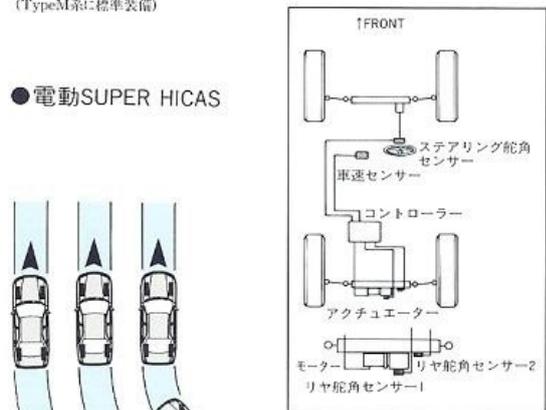


Nissan make new technology of 4ws using computer like Mazda but HICAS system was more developed and makes 4ws easier and better. Nissan use its technology of 4ws for most of his cars (Skyline GTS, Serena, Largo and others.) Mazdas and Nissans system need special liquid for hydraulic pump.

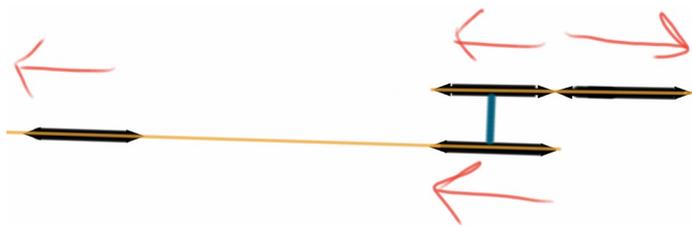


駆け抜ける抜群の操縦安定性が体感していただけます。
(TypeM系に標準装備)

●電動SUPER HICAS

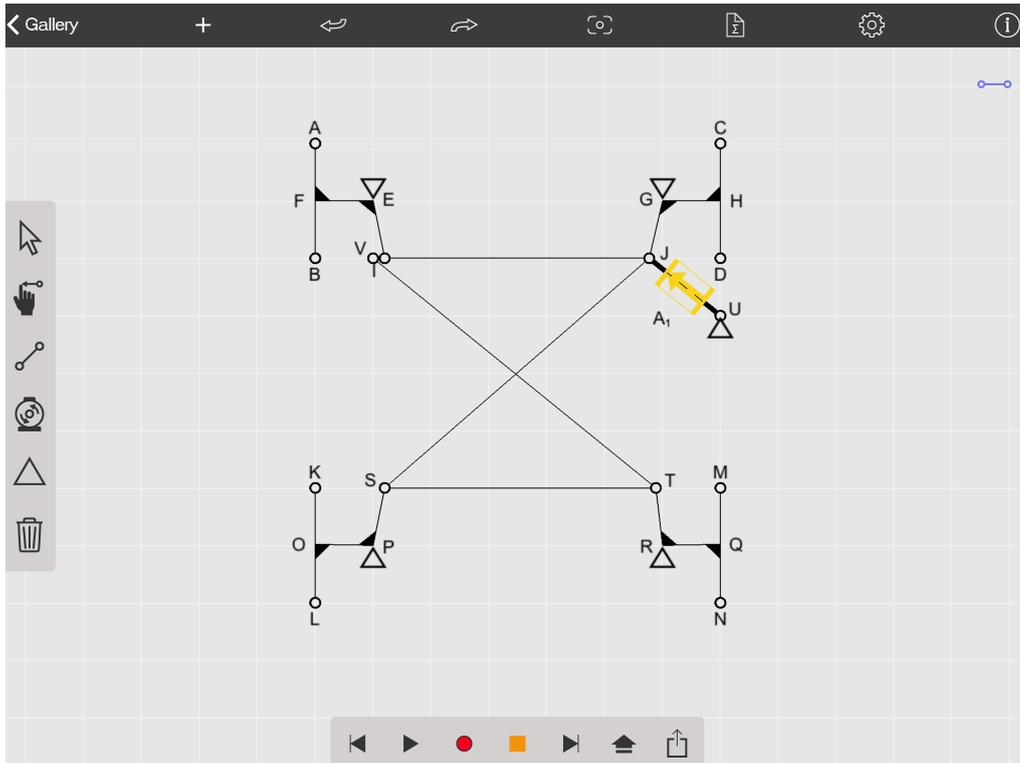


Main concept of 4WS

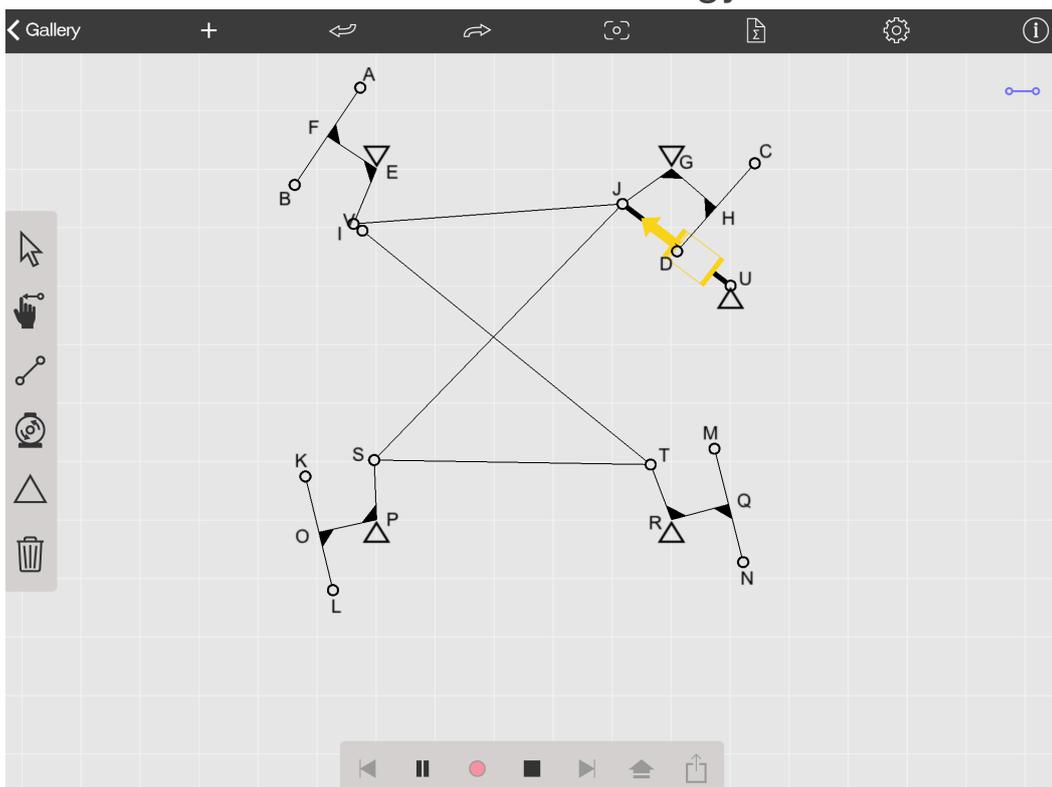


Black is gears, yellow is cycle. There is 2 gear. (Horizontal image of 1 technology).

Second. My second technology is good, but angle of rear wheel turning isn't so big like front. And for real car this technology isn't realistic and hard to realize.

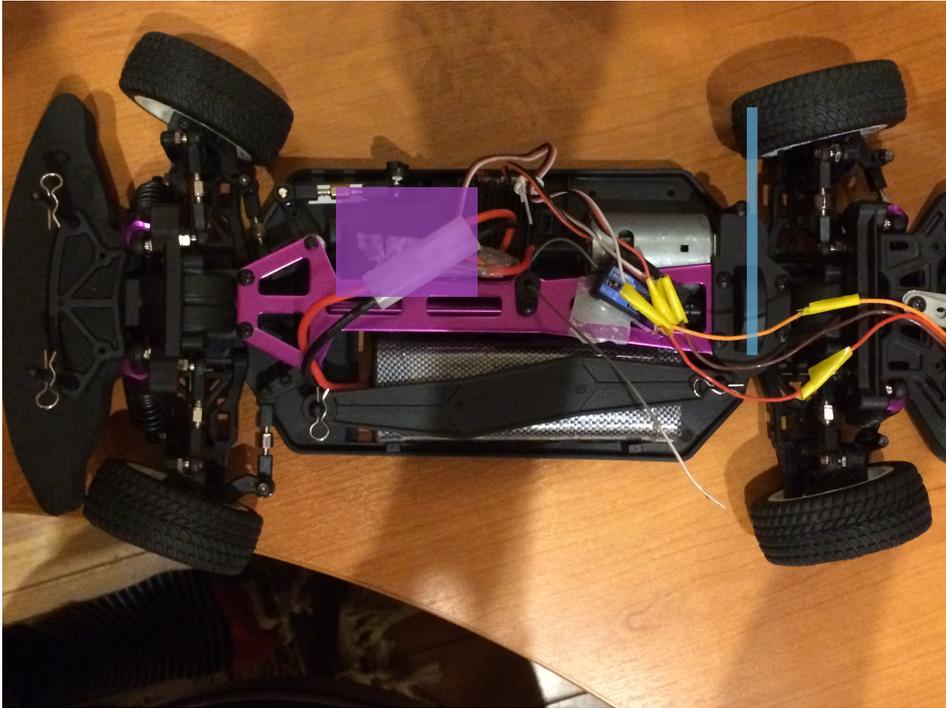


The sketch of technology 2

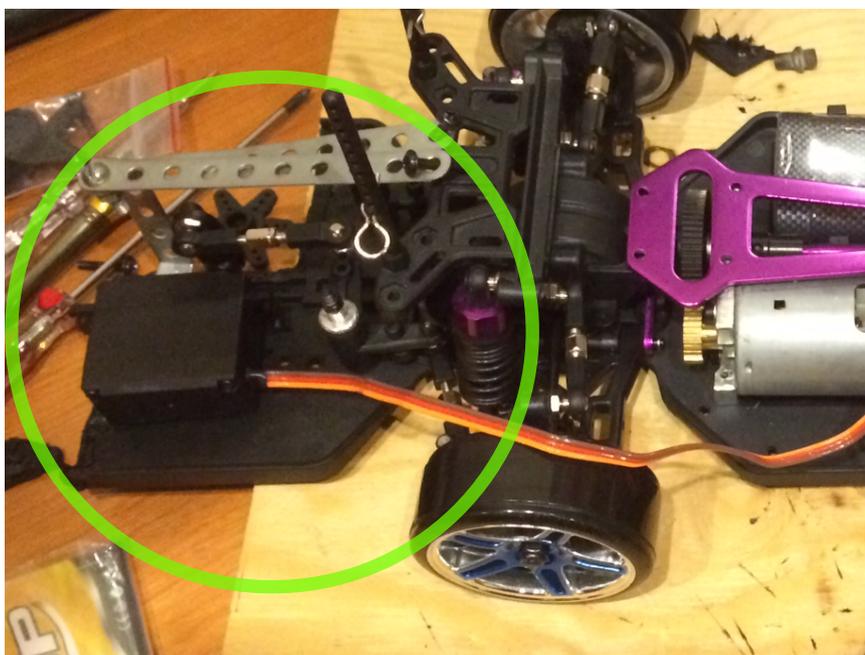


Technology 2 when it turn.

Third. Technology 3. I make the copy of front wheel steering mechanism and but it in the center. I have to cut My car in the center and put it there with second turning engine. Engine 1 and engine 2 have (+);(-),(0) But I won't do it because technology 4 is the best.



Fourth technology. 4th technology is the same as 3d but everything will be placed in the back of car. And I'll add smth to hold everything in the back. so I don't have to cut my car in the center.



What I need to reach my goal.

- a. I need a lot of time because making car takes long time.
- b. I need patience. It's hard to make car, if you don't have big experience and patience.
- c. I have to use my communicative skill.(I will talk with experts in car modeling often).
- d. I have to organize myself good.
- e. I need to make list of things that I need for making my car.

(This is the most important things that I need.)

The advantages of 4ws:

1. This system increase the permeability of car when it's turning.
2. Maneuverability of car become higher.
3. Stability of car become better when it turns.
4. Parking become easier than before.

Disadvantages:

1. Technology of 4ws is breaks often. (Because it has a lot of thing in it, there is no computer system)
2. It's uncomfortable to drive car with 4ws first time.
3. Technology don't have good synchronization.
4. Adds additional weight for car.
5. The angle of rear wheel turning isn't big(10°)

Planning

Criteria's of my personal project.

1. I have to made a car with 4ws and it's able to drive it with 4ws. I+I
2. The car has something that can turn off 4ws. I-I
3. After turning off 4ws, the quality of car will be the I+I same.
4. Rear wheels turning system is the same that front wheel. I+I
5. 4ws construction mustn't have problems that Toyota has in its 4ws construction. I+I

Plan

1. I disassemble my car and learn construction of it because I have to find the easiest way of tuning.
2. I'm thinking about details that I need for tuning.
3. I'll find where to buy details for my tuning.
4. I'll buy details for my tuning.
5. I'll discuss with supervisor about my method of tuning my car.
6. I'll tuning my car. I have to do it early because I need to test it. (It took me 2 days)
7. I'll test my car after tuning, if I have problem I'll solve them.
8. I'll discuss my car with supervisor, father and experts about my construction of 4ws, pluses and minuses.
9. My car is ready.

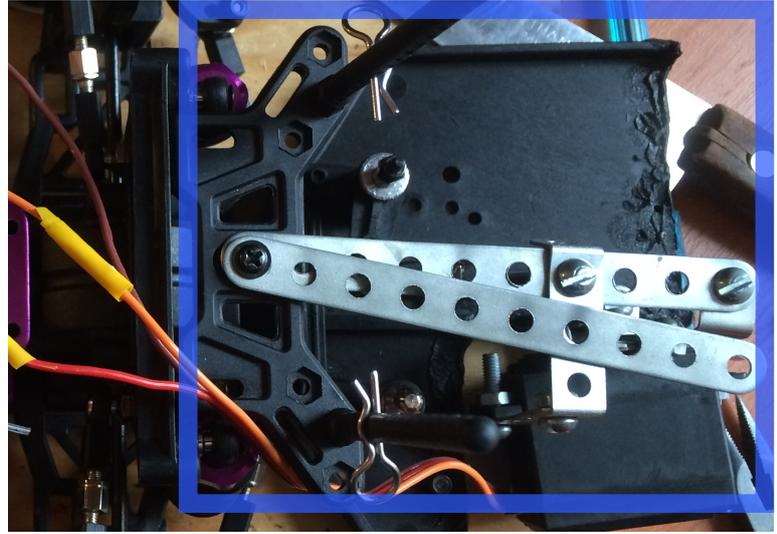
Taking action

My work was unpredictable. I take a risk when I choose this theme. I wasn't sure at all that I would make my car but I did it. Before starting to work I had to imagine everything (All construction of my 4ws in my car) it was hard for me. I didn't make a sketch of my car because it's hard for me, but I have great imagination. Also I was communicating with experts of car modeling a lot of. They helped me in my project with choosing details for my car. Self organization one of the most important qualities that I was developing when I was doing my project and principality that helps me all time. When I become too lazy my principality didn't allow me to stop my work.

I started my work when I had bought everything that I need. (soldering iron for cutting, details, knife, Screwdriver set) My work takes 2 day long. When I was working I had a lot of problems that I solved without any problems. I was thinking about everything when I was solving by problems. It's important because I didn't have back way. Each mistake was straining me but I didn't stop. I was just going straight and nothing, nobody can be a problem for me. 1) I started to make 4 ws on my car from changing wheel **details**. I made it on the right and left sides.

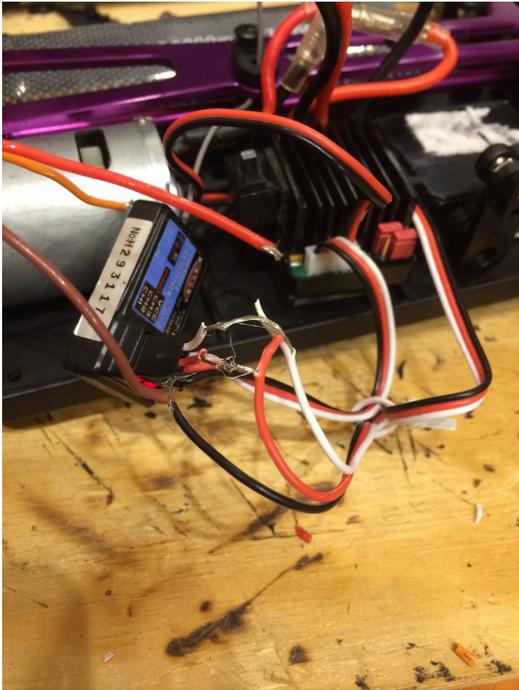


2) After working with wheels, I started to make the rear turning mechanism. I made place for it and consolidated it very good. After I put my turning mechanism on it and connected it with my car. (By metalical plate).



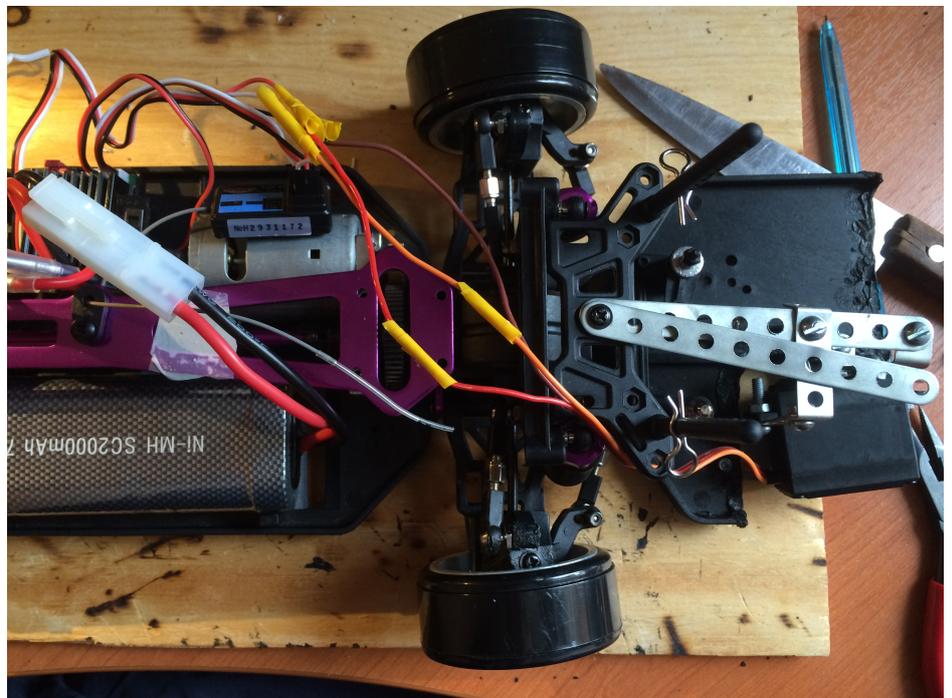
3) I put my turning engine In the back of my car and

connected wires of engine 1 and 2.(+ +;--;00)



I'm working with wires.

4) I finished all my work with car and



I've completed my work with

tested it. So I don't have any problems. I'm preparing to my presentation.

(When I ended my work with my car I was very, very, very happy.)

Before I started to work with my car, I was waiting when delivery service will bring me my details. After first 2 days of my work I again bought new details, and new engine.

So the engine was broken and I buy everything without engine. After I bought it in other store.

Piece of my journal

25.01.16 I bought details.

29.01.16 Rc-go(Company) delivered me my details.

30.01.16 I'm starting making 4ws on my car model!!

30.01.16 I change my tech little bit, so my dad helped me, i have to buy new details:02062(2), clips(4),10391, servo,02033(2), 02079(2),02080(2),08027(2),02100(2), bolt and gaika. Shassi

01.02.16 I'm writing criteria /C/.

I'll meet my teacher. I have to discuss with him my criterial writing.

05.02.16 I have been waiting for my details from 18:00 until 21:00 and nobody called me, I don't know what happened to them

06.02.16 Today I'm learning why my details wasn't deliver yesterday. So my servo was broken and they didn't bring it to me, they promised to bring it to me today. 17:24 delivery service call and said that they had brought my details. So I'm starting to work, but I don't have servo, so I start to make it and I'll buy tomorrow my servo. (This project become real investigation for me) I was angry when I

heard that my servo is broken. Also they offered me to by another but it's more expensive so I'll buy my self.

07.02.16 I finished my work car is ready. Yeeeeeeeeeeeeeeeeeeahhhh, My dad and Mum helped me. Everything is ready yeeeeeeeeeah yeeeeeeah.

12.02.16 I have bro lens with my car. I solved them. I start to test last part of my tech. It's working!!

15.02.16 I'm redact my writings. My meet with my teacher, also I start to make my presentation.

17.02.16 I'm continue my writing.

18.02.16 I finished all my work. Tomorrow is presentation.

Reflecting

- 1) I've tested my car with 4ws and its working without problems. It's the main criterion for my product.
- 2) I couldn't find something that can turn off 4ws without problems. I can do it and I'll but I don't have a time to make it until deadline. This criterion isn't so important like others, but it'll be good if I make it.
- 3) When I disconnected rear turning system from all car, the quality of my car didn't become bad. This criterion is too important for me and my project.
- 4) I made rear wheel turning mechanism as front wheel turning mechanism. This criterion is important because it makes my work easier and faster.
- 5) I've tested my car, and it doesn't have problems that Toyota has. Toyota made everything in 4ws without using electronically system but I did and it makes my technology easy.

My global context is science and technology innovations. Completing my project developed in me qualities: willpower, self organization, communication skills, inquirers, risk-taking, principality, critical thinking. Also I

got experience in making projects and car modeling. I'm sure that this MYP project helps me to be successful in the future because I developed myself in lot of directions. May be I won't become an auto engineers but this properties will help me everywhere.

End: This project was really interesting and it was exciting for me because MYP:personal project become for me real Investigation about 4 wheel steering. In this project have taken a part: my dad(helps me with good ideas and advices about my technologies), my mother(Who helps me when I was making my car), my brother who was bringing me everything), my sister(Was helping me to "catch" my supervisor, his very busy men), my supervisor and others. I reached my goal and I'm happy. I think it was good idea to combine my hobby and my project. I knew slot of other things about myself. I believe, believe and will believe that Impossible is possible! Thank every body!

Bibliography

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