



SR. D.E.E. (T.R.S) E.M.U.

CARSHADE

KURLA



PROJECT REPORT

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By:-

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The project was to re-create the model of
Sandhurst road railway station with some additions
from our side

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ABSTRACT

Central Railway workshop, Kurla has been initially providing services for inplant training over the period. Over the year this workshop has been diversified and increased its activities and presently it undertakes inplant training.

It also carries out the repairs of large number of locomotives to keep AC emu rakes in good conditions.

This report gives information on the record equipment AWS, Siemens Section of Central Railways , about the power distribution, brake equipment, pantograph , AC three phase induction motor , Over Head equipment (OHE) , electric locomotive components.



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Sr.No	TIME	DETAIL
1.	-	Materials Used
2.	1 st -WEEK	Inspection of coaches
3.	2 nd -WEEK	Filing
4.	3 rd -WEEK	PCB Designing
5.	4 th -WEEK	Assembling
6.	FINAL	Testing

MATERIALS USED

- Arduino Mega
- 16 Pin LCD Display
 - Copper Clad
 - SMPS
 - Switches
- LEDs (red, green, yellow)
 - M-seal
- Screws, nut, bolts
- NO SWITCHES
 - 6 Pin JSTs
 - 4 pin JSTs
- Insulation Tapes
 - Sandpaper
- Wires of different colours
 - Switches
- Basic tools like files, pliers etc.
- Multimeter to test continuity
 - Screwdriver, testers

WEEK-1

We 4 students of Fr. Conceicao Rodrigues Institute of Technology, Vashi. Were introduced to the various sections of Indian Railways in Kurla Carshed in 7 day training.



- Coaches: From the next day we were given the coaches.

All the coaches were in a bad condition as none of them were working as wiring was broken in some, in some the motors were not working properly.

Opened all the coaches, studied the wirings, adjusted the bogies, tested the motors with the help of 9V battery, corrected all the wirings and tested with the help of multimeter.

- Pantograph: The pantograph as said, it is the most critical equipment for the train. To make the pantograph intacked to OHE while moving was one of the biggest problem we faced. Pantograph rubbed with sandpaper and the wire was soldered to the plate, proper spring was used to keep it raised and the continuity was tested.



- Bogies: The bogies are the reason for making the train turn on the curves. The condition of bogies was same as that of coaches i.e. they were rusted because of which proper grounding wasn't achieved.



WEEK-2

After the coaches were made ready the next thing was to make the track and OHE smooth and straight.



- The OHE were broken and the tracks were not continuous. There wasn't a proper conduction taking place through the OHE to the pantograph. The OHE was made smooth and greased so that there won't be any obstruction by the pantograph to the train. After the detailing on the pantograph the proper continuous connection was established between the pantograph and OHE.
- Tracks:- The tracks were made of metal and it was coated black but the top part was corroded and need to be filed in order to avoid smooth movement of wheels on it. There were many joints in which the tracks were broken and it was difficult to join them which led to derailment of train many a times.

- Previously the model was made working with the help of digital circuits boards, relays which required complex wiring.



We decided to make an analog circuit which is more easy and doesn't requires many electrical resistors, relays etc. and is quite more efficient.

WEEK- 3

The third week was crucial week as the majority of implementation of our idea was done.

- Grounding the tracks:- The tracks need to be shorted in order for the train to run. The tracks were shorted and continuity was tested with the multimeter. All the tracks were connected to each ground wire which is connected to common ground.
- Wiring of signals:- The wires were picked up from the existing signals. Some wires were in a good condition but some were not. The same colour codes were kept that were there before. Those were for Red LEDs red wire was used, yellow for yellow and green for green and black is kept as neutral. All these wires were bunched together and were taken to the front end.



- Wiring of NO SWITCH:- The NO SWITCH solved our purpose as we were planning to use Photodiode and photosensor which

was difficult and required more wires. But NO SWITCH required only 2 wires. Incoming was red and outgoing was black. All the sensor wires were bunched together to their respective signal wires and were taken to the front end.

To protect the wires from damage they were passed through a pipe to keep them safe and then were tied to the table.

While testing the sensors and LEDs many LEDs were found damaged. The LEDs were changed and new NO SWITCHES were introduced instead of old ones.

- Supply:- The 12V DC supply was to be given to the OHE. But the supply available was 220V AC supply. The SMPS (Switch mode Power supply) solved our purpose. It directly converted 220V AC to 12V DC.

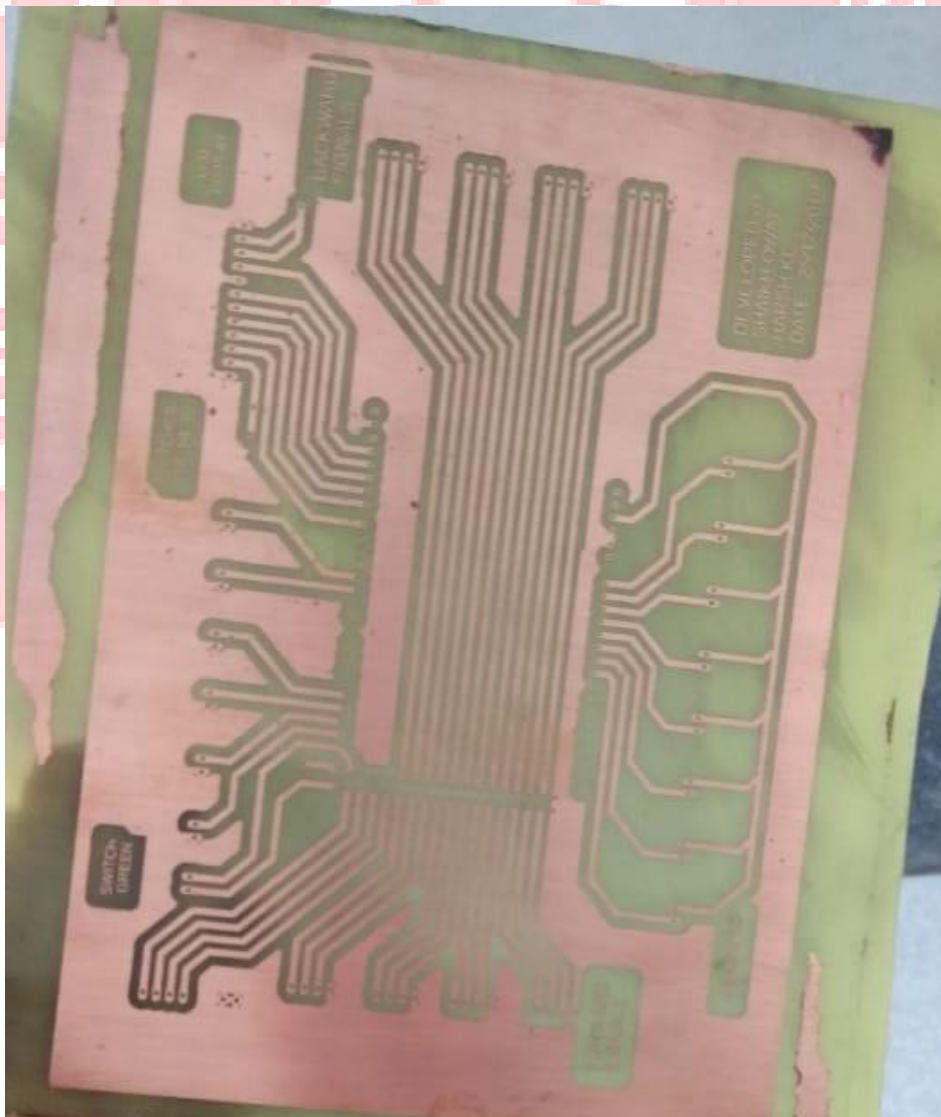


At this point our train was running but derailed a lot of times which led to loosening of screws which ultimately slowed down our progress.

WEEK- 4

This was the final week as per our assumption. We spend most of our time in our college to make the PCB and do all the soldering.

- PCB:- The PCB was made to make the complex wiring connections simple. The PCB was first designed on the eagle software and then was printed on the glossy paper. Then the glossy paper was laminated on the Copper clad and then was etched with FeCl_3 . Then it was cleaned to give us a desired PCB.

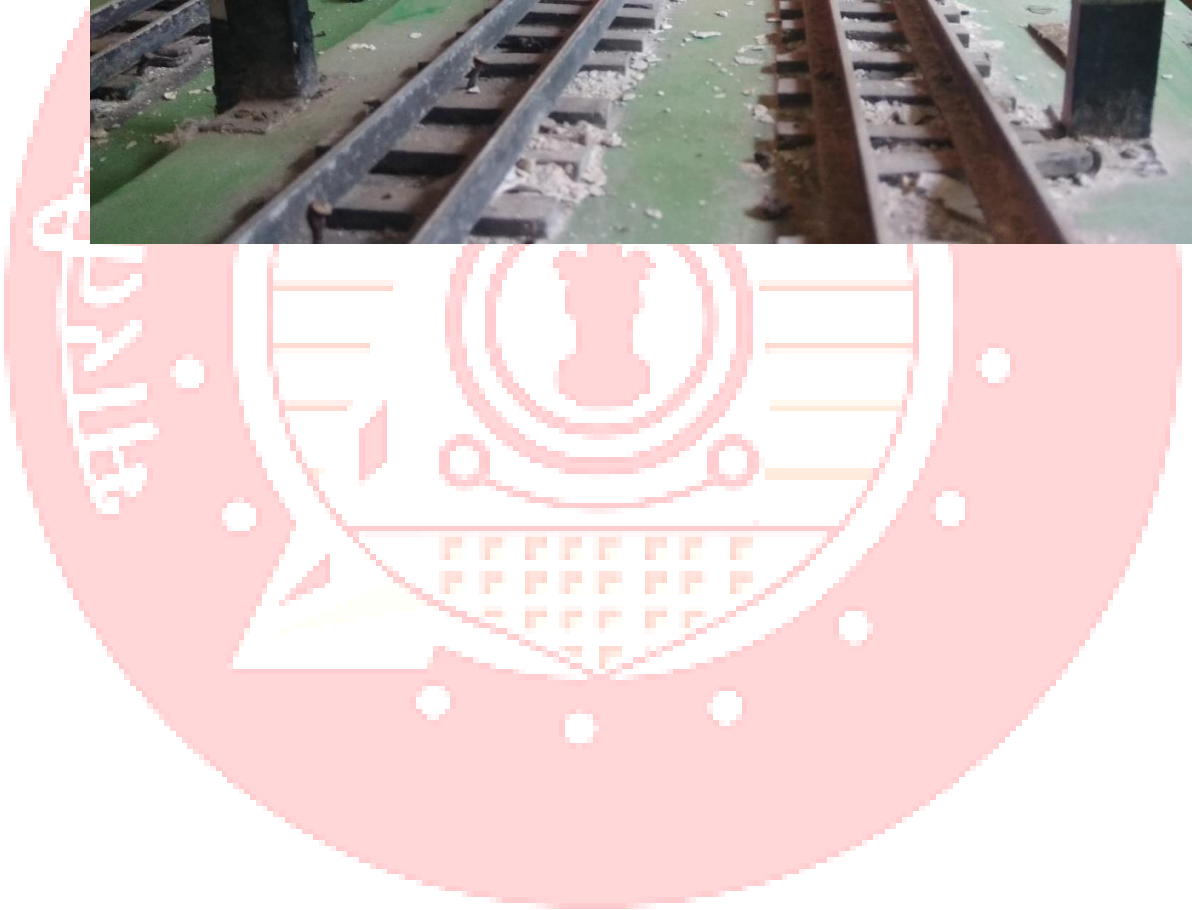


The PCB was made and then JST were soldered on them. Another PCB was made i.e. the power PCB which had 3 relays to reverse the OHE supply in order to bring the train back.

- Coding :- ARDUINO MEGA board was the development board we used. Side by side the code was prepared. The code was made on Arduino ide. The display was also brought. The code was embedded in the board storage and pins were placed.



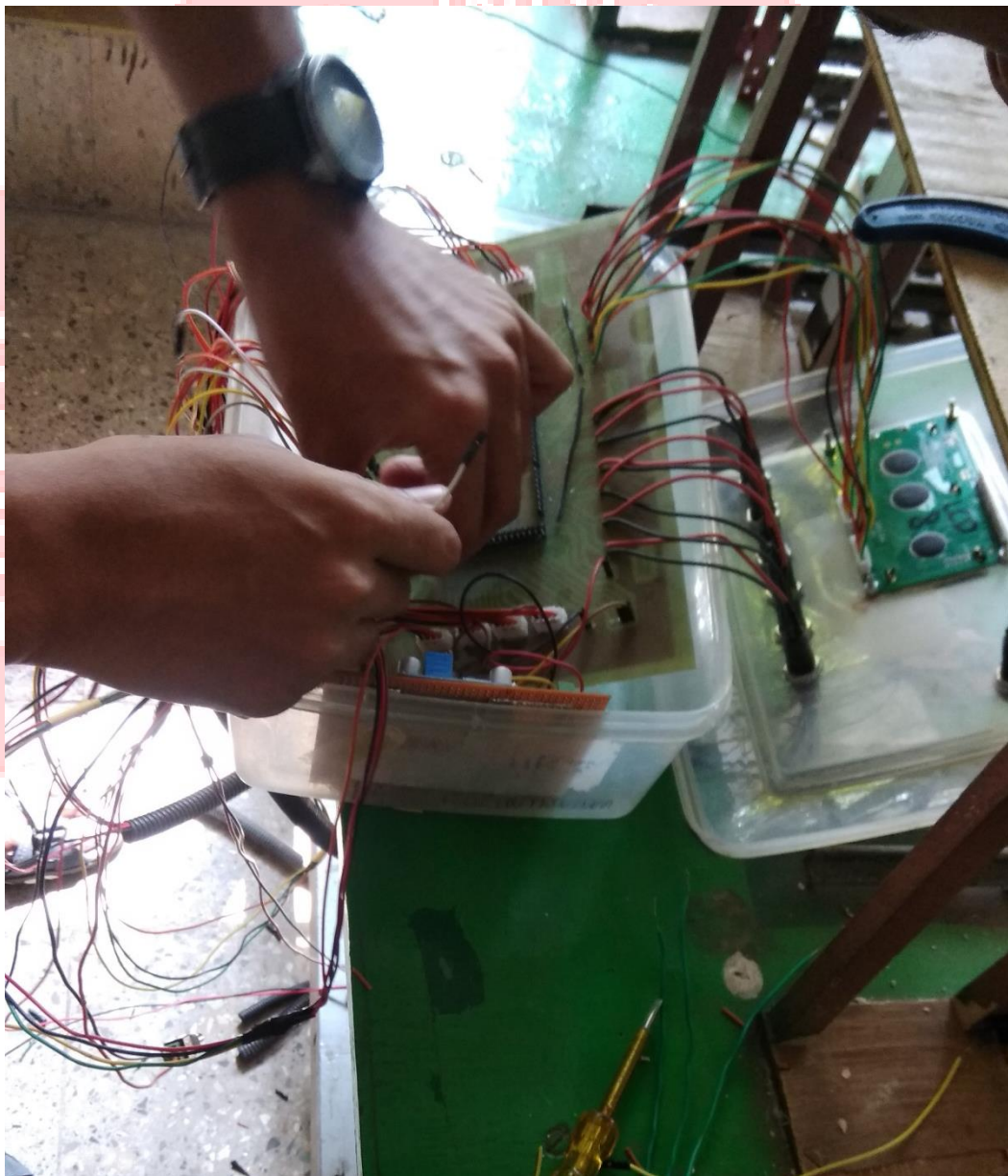
The supply was given and the signals were tested, sensors were tested individually.



FINAL

We were told to make the connections detachable so that setting up and removing the wires is easy and which doesn't hamper the connections.

We incorporated every thing inside a plastic box.



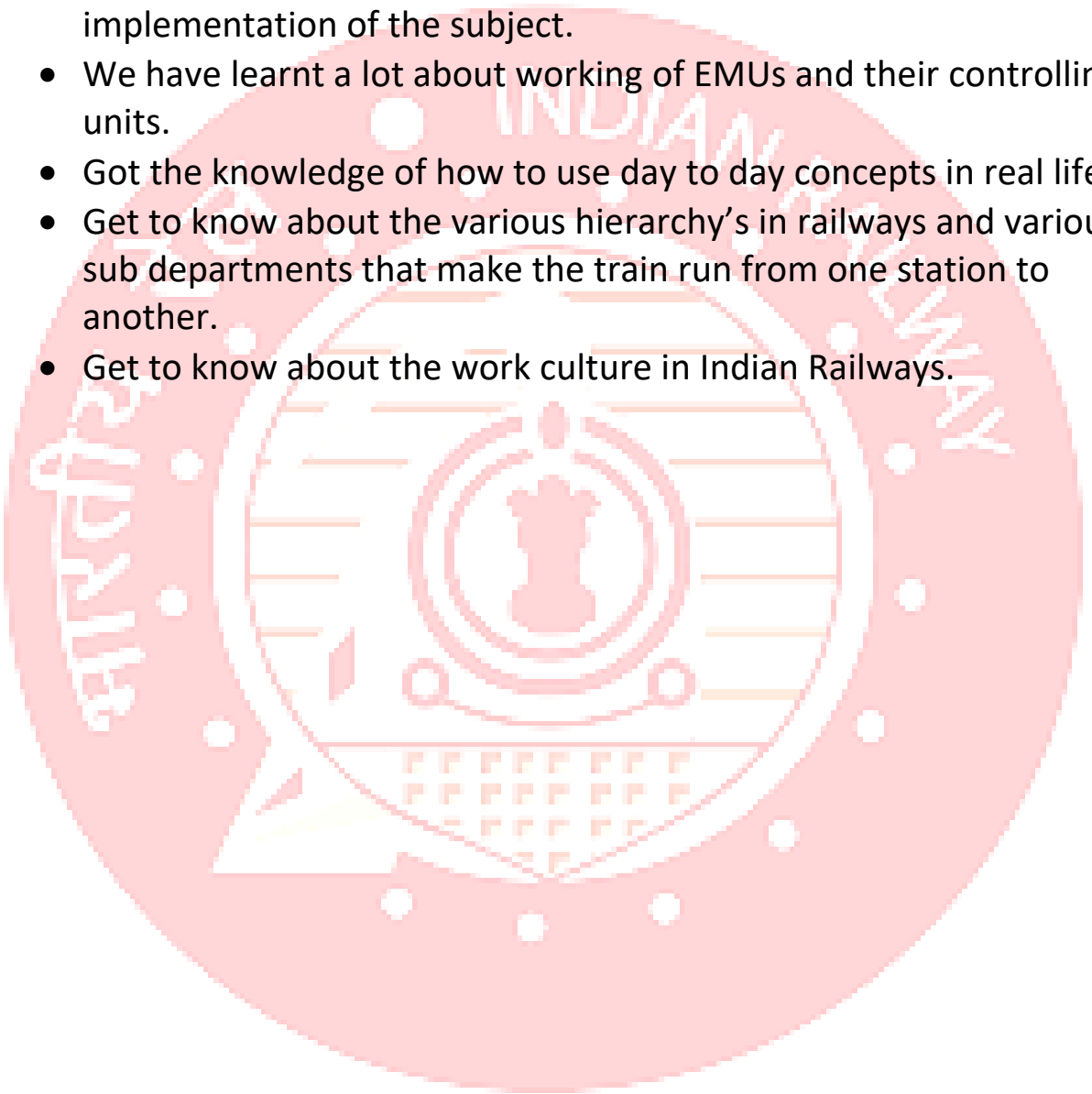
There were some additional features we made to make user friendly: -

- The LCD display showed the name ,signal crossed when train crosses the signal, starter timer before forward and backward movement of the train.
- Interrupts:- The Push button switches were placed . When the switch for particular signal is pressed the signal turns red and the train stops before it at a some distance and when pressed again it turns green and train starts again.
- The ON-OFF button separately for train which is controlled manually.
- A reset button for ARDUINO MEGA board which also gives user the control to reset the board.
- Yellow Headlight filament bulbs to give it a better aesthetics.



CONCLUSION

- The main objective was to learn and know about the physical implementation of the subject.
- We have learnt a lot about working of EMUs and their controlling units.
- Got the knowledge of how to use day to day concepts in real life.
- Get to know about the various hierarchy's in railways and various sub departments that make the train run from one station to another.
- Get to know about the work culture in Indian Railways.



THANK YOU

