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Dynamic Wireless Charging for Electrical Vehicle

G. Madhuri[1]

Assistant Professor, Department of Electrical and Electronics Engineering, Vignan Institute of Technology and Science, Telangana.

N. Varshitha[2]
T. Sai Kumar [3]
J. Akshith[4]
G. Srikanth [5]

U.G. Student, Department of Electrical and Electronics Engineering, Vignan Institute of Technology and science, Telangana.

Abstract: ***This project is aimed to design a system that can charge an electric vehicle battery wirelessly when the electric vehicle is in motion. It is similar to wireless charging for mobile The method used in this inductive power transmission. The challenge is applying the wireless inductive power transmission system on roads to generate the vast magnetic field to get the vehicle charged. This technology is claimed to be allowing wireless charging of electric vehicles that have ground clearance up to 18centimetres. The road uses charging plates that will transfer the power to the vehicles whenever electric vehicles are driven on road. This charging system must and should have coil alignment. Normally the battery charging of an electric vehicle takes a long time so here this charging system can be used and this is a very efficient method to charge the vehicle. The coil alignment and the distance between the coils are important factors for dynamic wireless charging for the electrical vehicle.***

Keywords: Coil Alignment, Electrical Vehicle, Wireless Charging, IPT.

I. INTRODUCTION

Wireless power transfer is the transmission of electrical energy from a power source to an electrical load without connection. This is used in such cases where the interconnecting wires are inconvenient or impossible. And here automation is used. This both gives greater advantages like accuracy, reliability, and moreover, the automated system does not require any human attention. The project consists of two self-resonating copper coils of the same resonating frequency of about 100khz. one copper wire is connected to the power source(transmitter), while the other copper wire is connected to a device(receiver). The electric power from the power source causes the copper coil connected to it to start oscillating at a particular frequency. This generated magnetic field further transfers the power to the other copper coil connected to the receiver. Dynamic transmission based on induction technology. Wireless charging eliminates the cable typically required to charge mobile phones, cordless appliances and so on. With a wireless charger, the battery inside any battery-powered appliance can be charged by simply placing the appliance close to a wireless power transmitter or a designated charging station. As a result, the appliance casing can be made completely sealed, even waterproof. Besides the inherent convenience it offers, wireless charging can also greatly enhance reliability, since the charging plug on the side of an appliance can suffer mechanical damage easily, or simply by someone inadvertently plugging in the wrong adapter. This method is very efficient for charging the electric vehicle and no battery stations are required. Charge the battery very fast than the static charging method.

II. METHODOLOGY

Our experiment had six basic parts: the pulse generator, sending coil, receiving coil, rectifier, regulator, and load. The copper coil, illustrated by object A, is a single loop of insulated copper wire. The resonant frequency of our coils at Which we get the most power varies with the distance between the coils. Due to this, we choose to use a function generator so that we could adjust the frequency as needed. Several oscillators were built to generate certain frequencies, but due to the varying nature of our resonant frequency, a frequency generator like PIC16F72 as a Pulse generator was used. A frequency generator PIC16F72 microcontroller outputs a signal of the same frequency as the resonant frequency of our copper coils because we can output maximum power at this frequency. The signal generated is put into our driving generated loop of 10-gauge wire. The loop is just smaller than our primary coil (approximately 55.5 cm in diameter). The AC current in the driving loop causes the loop of wire to behave like a dipole. The driving loop is positioned parallel to the primary coil, as close as possible.

The flux generated by the driving loop through the primary coil causes the coil to resonate. It is important to realize that the driving loop does not make the secondary loop resonate directly. The evanescent waves emitted by the primary coil cause the secondary coil to resonate because the coils are of the same shape, size, and mass (or close to identical). Both the primary coil and the secondary coil are made of copper tubing that is 1/4 inch inner diameter (3/8 inch outer diameter). At this point the two coils are parallel to each other and resonating, using only enough power to make the driving loop “drive” the first coil.

The distance between the primary and secondary coils determines the magnitude of power that is transmitted. The power exponentially decays as the coils are moved further apart. When the secondary coil vibrates at its resonant frequency, a stronger magnetic field is generated. The receiving loop of the 10 gauge wire is situated parallel to the secondary coil, as close as possible. The magnetic flux from the secondary coil induces a current in the receiving loop, which drives a resistive load.

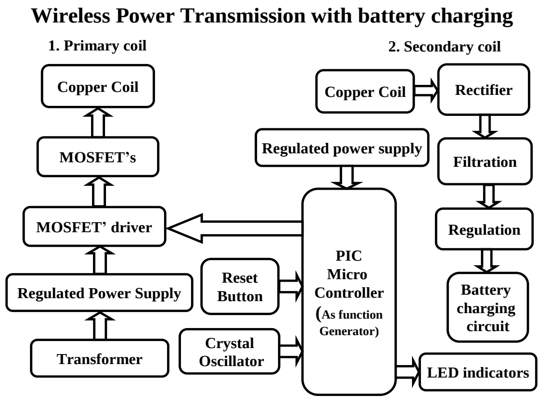

Figure 1 Block diagram of dynamic wireless charging for electrical vehicle

ADVANTAGES

- Efficient.
- Low-cost design.
- Low power consumption.
- Easy to operate.
- Stable performance and long life.
- Efficient design.
- Easy to install.
- Fast response.
- Helps in the transmission of power wirelessly.

DISADVANTAGES

- Limited distance
- No feedback

III. RESULT

The project "DYNAMIC WIRELESS CHARGING FOR ELECTRICAL VEHICLE" was designed such that wireless energy transfer or wireless power is the transmission of electrical energy from a power source to an electrical load without a conductive physical connection. With the advancement of EV technology, charging infrastructure, and grid integration facilities, EV popularity is expected to increase significantly in the next decade. The system is successfully designed and tested.

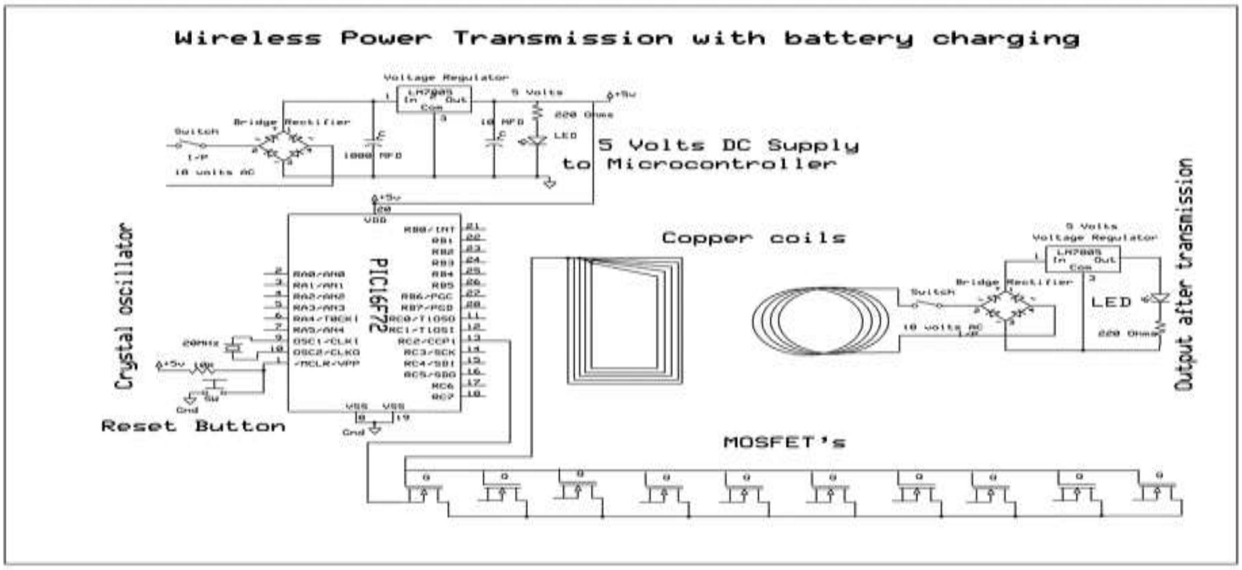

Fig 2 Circuit diagram

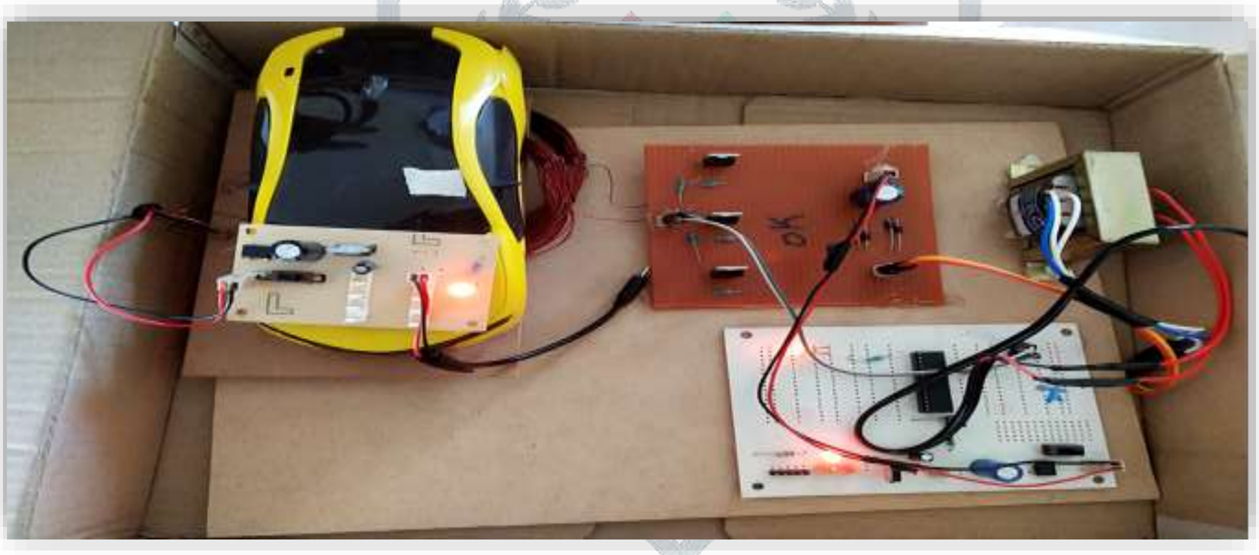

Figure 3 Practical working of the project

IV. CONCLUSION

A dynamic wireless charging system is the system in which EV is charged while it's in motion. The main concern for electric vehicle deployment is the power and range. For improving the range of the vehicle dynamic wireless charging will be beneficial. The DWCS is also termed as "on-road charging". If the charging is done at proper intervals a large capacity battery is not required and this makes the vehicle lighter and more economical.

V. FUTURE SCOPE

Our project "Dynamic Wireless charging for electrical vehicle" is mainly intended to Wireless energy transfer or wireless power is the transmission of electrical energy from a power source to an electrical load without a conductive physical connection.

Wireless transmission is useful in cases where interconnecting wires are inconvenient, hazardous, or impossible. This system is incapable of giving feedback on the devices being operated. This can be eliminated by using LCD display technology, which displays the voltage measured on the LCD display unit also gives feedback through LED indicators. GSM module also can be used to get the feedback of the electrical devices by sending the SMS in a particular specified format. Based on the policy guidance and technologies that spring up.

This section is supposed to envision the future WEVC Nowadays, global EV inventories are expanding vigorously. Under the trend of industrial prosperity, two potential orientations in WEVC consist of how to guarantee a sustainable growth of EV ownership and how to allow full play of scalable development of EVs. Moreover, arising new technologies, materials and theories could make WEVC even more competitive. Power electronic devices can benefit from advanced materials as well.

For one thing, besides flux leakage, switching loss is another major source of energy waste in a WEVC system. Dispensed with manual operation, static WEVC can liberate the operators' hands but fails to make charging sites more flexible. In this context, dynamic WEVC shows its unique advantage. This technology could be roughly divided into tram-based and on-road types.

REFERENCES

- T. R. Hawkins, B. Singh, G. Majeau-Bettez, and A. H. Strmman, "Comparative environmental life cycle assessment of conventional and electric vehicles," Journal of Industrial Ecology, vol. 17,no. 1.

- S. Lukic and Z. Pantic, "Cutting the cord: Static and dynamic inductive wireless charging of electric vehicles," in Electrification Magazine, IEEE 2013, vol. 1, no. 1. pp. 57-64.

- G. Putrus, P. Suwanapingkarl, D. Johnston, E. Bentley, and M. Narayana, "Impact of electric vehicles on power distribution networks," in Vehicle Power and Propulsion Conference, 2009. VPPC '09. IEEE, 2009.

- G. Jung, B. Song, S. Shin, S. Lee, J. Shin, Y. Kim, C. Lee, and S. Jung, "Wireless charging system for on-line electric bus(oleb) with series connected road-embedded segment," in Environment and Electrical Engineering (EEEIC), 2013 12th International Conference on, 2013.

- M. Badawy, N. Arafat, S. Anwar, A. Ahmed, Y. Sozer, and P. Yi, "Design and implementation of a 75 kw mobile charging system for electric vehicles," in Energy Conversion Congress and Exposition (ECCE), 2013 IEEE, 2013.

- S. Deilami, A. Masoum, P. Moses, and M. A. S. Masoum, "Realtime coordination of plug-in electric vehicle charging in smart grids to minimize power losses and improve voltage profile," Smart Grid, IEEE Transactions on, 2011.

- S. Bohn, M. Agsten, O. Waldhorst, A. Mitschele-Thiel, D. Westermann, and P. Bretschneider, "An ict architecture for managed charging of electric vehicles in smart grid environments," in Journal of Engineering, 2013.

Author Profile

Guide

Gottipati Madhuri, Assistant Professor at Vignan Institute of Technology and Science located in Deshmukhi of Telangana state.

Nanjuti Varshitha, is a student in Vignan Institute of Technology and Science located in Deshmuki of Telangana State. She is currently pursuing her B.Tech in Electrical and Electronics Engineering.

Thummunuru Saikumar Reddy, is a student in Vignan Institute of Technology and Science located in Deshmuki of Telangana State. He is currently pursuing his B.Tech in Electrical and Electronics Engineering.

Janagam Akshith, is a student in Vignan Institute of Technology and Science located in Deshmuki of Telangana State. He is currently pursuing his B.Tech in Electrical and Electronics Engineering.

Gorige Srikanth, is a student in Vignan Institute of Technology and Science located in Deshmuki of Telangana State. He is currently pursuing his B.Tech in Electrical and Electronics Engineering.