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ROGOWISKI COIL

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Abstract - *Today we live in 21st century and it is century where there is lot of advancement in the industrialization. As the time has passed there have been mass development in industries. Industry is a place which is meant for heavy work and heavy work means heavy load and very high current. And it becomes mandatory to keep a check on the current.*

So monitoring is must in industry. So it is necessary to keep check on this current. For this we sometime have to break the circuit and then test the current. Basically we test current as a precaution from short circuit and all. If excess current is flowing from a particular path means there is a fault or some internal shorting has occurred. And based on it respective measures are done to overcome it for smooth functioning.

So I have come up with an idea by which we can measure the current by just holding the coil across the wire through which the current is flowing and get the current reading without breaking the circuit.

***Key Words*: Industrialization, High current, Coil**

1. INTRODUCTION

1.1. Theory behind the project concept

A Rogowiski coil is an 'air-cored' toroidal coil placed round the conductor. The alternating magnetic field produced by the current induces a voltage in the coil which is proportional to the rate of change of current**.**

1.2. Problem Definition

Today with advancement in industries it is also mandatory to keep a check on the current flowing through different paths. Continuous monitoring is required for this without breaking the circuit.

1.3. Need for coil

With growing industries the risk also keeps on increasing. This is because of the heavy current that flows. It has to be monitored continuously.

So currents ranging from 50 to 1000A are to be monitored properly and prevent such circuit from any kind of short circuiting. So a device which help in doing such monitoring is required.

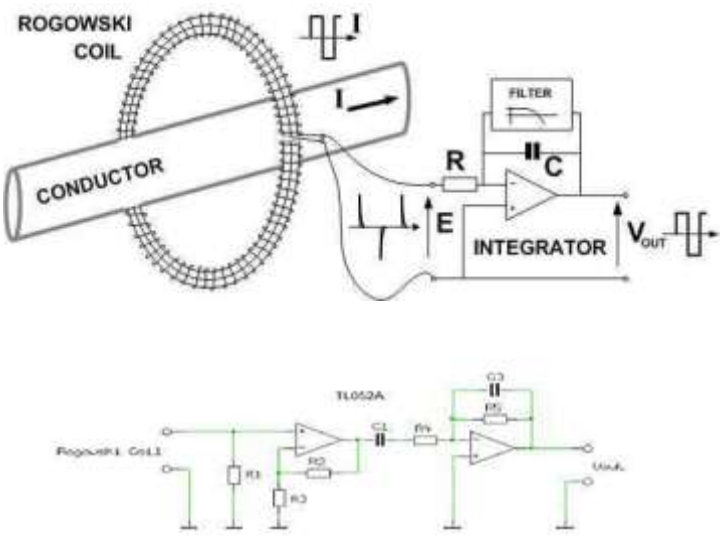
1.4. Process flow

1) Rogowiski coil: It is a toroid. It is a helical ring which is placed across the wire. When current flows through the wire magnetic field is generated and when it interact with the coil an emf is induced by Faraday law of electromagnetic induction.

2) Non inverting amplifier: The induced emf is then passed through the non-inverting amplifier. Because of which there is amplification on induced emf.

3) Integrator using op-amp: In order to get the output voltage proportional to the current we need an integrator circuit. It also has a RC network used for band limiting.

WORKING:



The coil is made up of a coaxial cable. Copper is wounded on it which is then shortened at other end so that the current will return to same position. And then 2 wires are taken out which is then connected to opamp circuit. When current starts flowing it generates magnetic field and this magnetic field when interacted with rogowiski coil induces emf by faradays law of electromagnetic induction. This induced emf is then applied to the opamp circuit.

Opamp circuit consist of two stages i.e. non inverting amplifier and integrator circuit.

The induced emf is first applied to the non-inverting amplifier which has a gain of 330, then this this applied to the integrator circuit. The integrator circuit consist of a RC network. This is because at low frequency the integrator

output goes up to infinity. So this RC network is placed at the integrator circuit.

Power supply: To make it portable a +8V and -8V power supply is made. It consist of 12-0-12 center tapped transformer. It consist of two regulator IC's 7808 and 7908. 7808 is used for positive 8V and 7908 is used for -8V. It also has bridge rectifier.

ADVANTAGES:

This type of coil has advantages over other types of current transformers.

1. It is not a closed loop, because the second terminal is passed back through the ...nly a plastic or r... that case: It has been shown that, with flexible sensors, the effect of the position on the accuracy ranges from 1 to 3%. Another technique uses two rigid winding halves with a precise locking mechanism.

2. Due to its low inductance, it can respond to fast-changing currents, down to se...

3.Because it has no iron core to saturate, it is highly linear even when subjected t... ...sed in electric welc...

4. No danger of opening the secondary winding.

5. Lower construction costs.

6. Temperature compensation is simple.

DISADVANTAGES:

This type of coil also has some disadvantages over other types of current transformers.

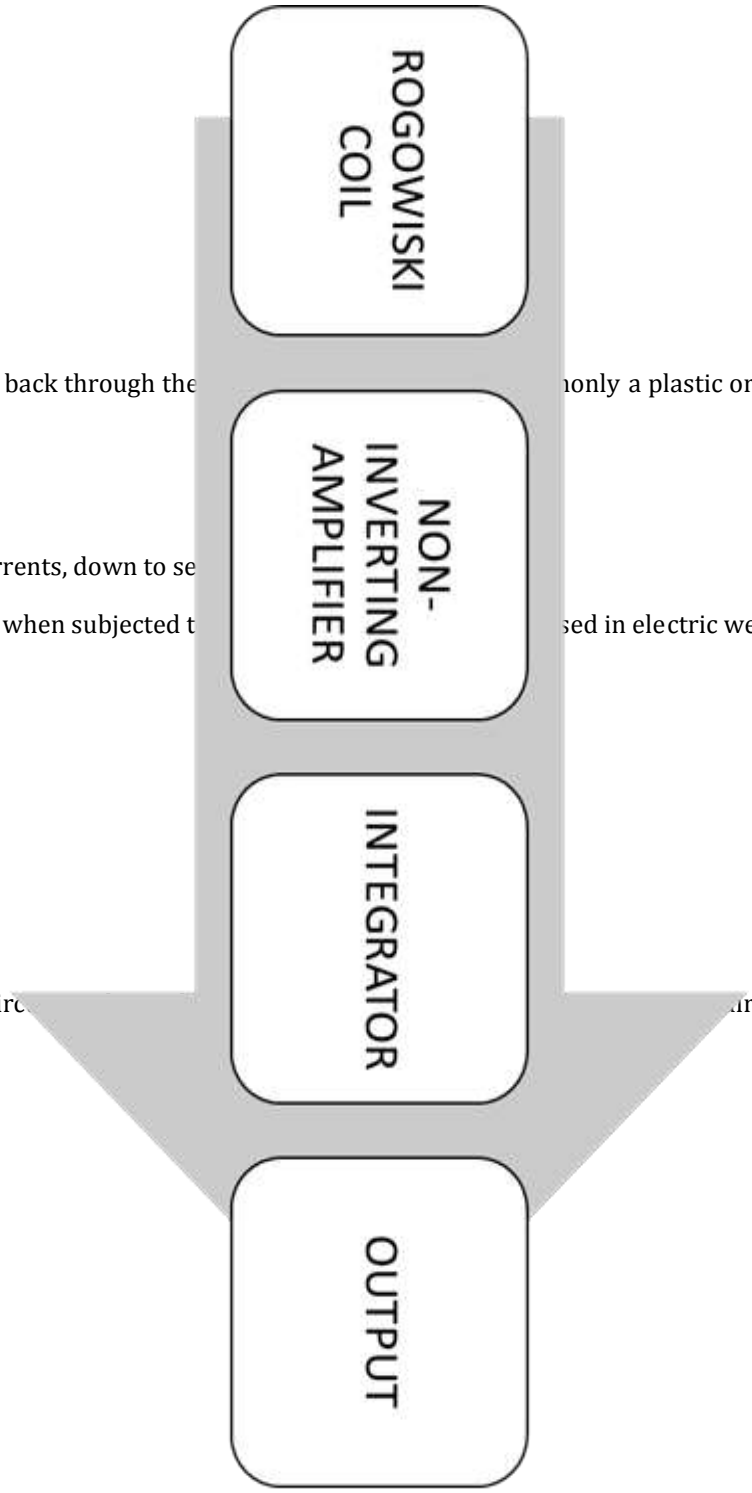
1.The output of the coil must be passed through an integrator circ... ...ures...

2. Traditional split-core current transformers do not require integrator circuits. The integrator is lossy, so the Rogowiski coil does not have a response down to DC; neither does a conventional current transformer. However, they can measure very slow changing currents with frequency components down to 1 Hz and less.

FUTURE SCOPE:

It is used in industries for the sake of monitoring. Further development can be done in it and it can be used for wide range of frequencies and also for further high currents. A is a high current measuring device we can further improve its configuration and make it avail for high frequency. It can be further used in large scale production industry for the better safety of the plant and for more producible work.

FLOWCHART



2. CONCLUSION

By successfully completing this research I have concluded that by just placing the coil around the wire through which the current flows we can get to the value of the current flowing through it. So now there is no need of breaking the circuit for measuring current. So now we can continuously monitor the current in big industries.

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