

Prevention of Vehicular Collisions with Inbuilt Electromagnetic Field (A Concept)

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Abstract: *In today's world, there is an alarming increase in the number of accidents due to very high amount of traffic and large number of vehicles. Scientists have come with various methods to prevent accidents or collisions. However, we have developed a very unique method to prevent collisions, which comes inbuilt with the vehicle. This method involves generation of an electromagnetic field strong enough, so that the magnetic field surrounds the entire vehicle. Since vehicles have most of their working parts in the front and in certain vehicles at the rear, the magnetic field generated due to the electromagnets will affect them. In order to overcome this, a smaller electromagnetic field is produced at the front or rear of the vehicle, having an electromagnetic wave in a direction opposite to the direction of the main magnetic field, thus nullifying the effect. Since every vehicle produced has the same principle as above, when two vehicles tend to collide, the magnetic field will tend to stop and will not repel due to the mass and having a finite area of magnetic field surrounding the vehicle. Thus, preventing the collision of two vehicles. Thus, this method is very useful in prevention of accidents and enhancing the security of the passengers in the vehicle.*

Keywords: collisions, magnetic field, electromagnets, magnetic intensity, vehicles.

1. Introduction

In today's world there is an alarming increase in the number of accidents due to very high amount of traffic and large number of vehicles. Also, statistics shows that street and professional races contribute a lot to these accidents as well in a significant amount.

There were 149,451 fatal crashes reported in 1998–2001. Of these fatal crashes, 315 (0.21%) involved street racing and street racing was a factor reported in 399 motor vehicle crash fatalities. Of the 399 fatalities, 299 (74.9%) were either the driver or passenger in the street racing vehicle. The yearly number of street racing fatal crashes was 59 (0.16%) in 1998, 78 (0.21%) in 1999, 62 (0.17%) in 2000, and 116 (0.31%) in 2001. In 2001 there was an increase of nearly 50 fatal crashes that involved street racing compared with the average of the previous three years.^{[1][2][3]}

Since human life is so invaluable, scientists and researchers have come up with efficient methods for prevention of vehicular collisions. However, we have come up with an efficient idea of preventing accidents in drag and professional races. In our unique method, it involves generation of an electromagnetic field strong enough, so that the magnetic field surrounds the entire vehicle.

Magnetism is a class of physical phenomena that are mediated by magnetic fields. Electric currents and the magnetic moments of elementary particles give rise to a magnetic field, which acts on other currents and magnetic moments.

Since vehicles have most of their working parts in the front and in certain vehicles at the rear, the magnetic field generated due to the electromagnets will affect them.

An electromagnet is a type of magnet whose magnetism is produced by the flow of electric current. The magnetic field disappears when the current ceases.^[4]

In order to overcome this, a smaller electromagnetic field is produced at the front or rear of the vehicle, having an electromagnetic wave in a direction opposite to the direction of the main magnetic field, thus nullifying the effect.

Since every vehicle produced has the same principle as above, when two vehicles tend to collide, the magnetic field will tend to stop and will not repel due to the mass and having a finite area of magnetic field surrounding the vehicle.

Thus, preventing the collision of two vehicles. Therefore, this method is very useful in prevention of accidents and enhancing the security of the passengers in the vehicle.

2. Design Specifications

A. Relationship between mass and magnetic field

We know,

$$m = B \cdot q / w$$

Where,

m=mass;

B=magnitude of magnetic field;

q=charge;

w=angular velocity.

From the above relation we determine, strength of magnetic field and mass are directly proportional to each other.

B. Magnetic field strength for electromagnets

We know,

$$H = I \cdot N / L$$

Where,

H – is the strength of the magnetic field in ampere-turns/metre, At/m

N – is the number of turns of the coil

I – is the current flowing through the coil in amps, A

L – is the length of the coil in meters, m.

From the above equation we conclude that, strength of magnetic field can be a constant value.

3. Construction

A. Since this method is only applicable in drag and professional races, we only consider the specifications related to the same. We know that an average mass of a race car is around 700 Kg. We have seen from the above magnetic relations that, magnetic field intensity is directly proportional to number of turns in the electromagnetic coil and current flowing through it. Also, it is inversely proportional to length of the coil. Thus, from these relations we can obtain constant values of magnetic field intensity. It can also be seen that mass of a body and magnetic field are also directly proportional to each other.

It is evident from the accident statistics, that accidents normal occurring in high profile drag and professional races. Since these races involve vehicles moving at very high speeds, probability of collisions occurring are also very high. In order to prevent this, we produce a magnetic field in each vehicle of constant value as seen earlier. Since it involves negligible difference of mass in racing cars, when two vehicles tend to collide, the magnetic field generated by the corresponding vehicles come in contact, thus stopping the collision.

B. However, generation of a powerful magnetic field results in damage of moving components. Since, vehicles have a large number of moving parts, it affects their predefined movements. To counter this, we place an electromagnet of considerably smaller magnitude, when compared with the larger one to in which its primary function is to prevent collisions. Normally, race vehicles have most of their moving parts placed at the rear and in rare cases at the front.

In either of the two cases, we place the secondary small electromagnet either at the front or at the rear, depending on the position of maximum components placed. This smaller electromagnet produces a magnetic field just enough to surround the main parts of the vehicle to protect it from the larger magnetic field. Also, this smaller electromagnet is developed such that it has an electromagnetic wave in a direction opposite to the direction of the main magnetic field. Thus by inducing this technique, we can nullify the damage to the minor moving components in the car.

4. Conclusion

Thus by adopting this unique method of preventing vehicular collisions, we can reduce the number of accidents occurring in races. However this method is not applicable to prevent accidents on normal roads due to different sizes of vehicles present. Since different sizes of vehicles are present, an uniform magnetic field will never be obtained. Due to which, when vehicles come in close contact the heavier vehicles tend to repel smaller vehicles which in turn leads to unwanted motion of the smaller vehicles. Also, in normal roads, there is a very high chance of finding smaller materials like iron scrap or larger ones like iron railings or barricades. Due to all these, shortcomings it is impossible to adopt this method on normal roads. However, in professional races, all these minor shortcomings are absent, thus we can successfully induce this idea and thus prevent high vehicular collisions.

5. Applications

As an 'Individual' there are many potential benefits by adopting this technique

- Less chance of being killed or injured.
- Less chance of ending up in prison.
- Lower insurance costs.
- Less frustration.
- Less traffic hold ups.
- More control.
- More responsibility.
- More opportunity to actively participate in society.

A. With road accidents there will probably be something like ten times as many people seriously and permanently injured as there are killed. Young drivers in particular tend to give little thought to the full implications of being involved in a serious road accident, with all the trauma and life changing consequences it can entail.

Something that might have started out as a 'bit of fun', can end up causing injuries like burns, facial scars, loss of limbs, paralysis and brain damage, which may last a lifetime and which no amount of regret, remorse or wishful thinking can undo. Thus, to prevent all of this we can successfully implant this idea and go towards a sustainable and a happy life.

B. The most obvious cost reduction would be in insurance premiums, less accidents means lower costs. Even if it means an increase for those with poor records for the majority, it would mean a reduction. Less accidents and a quicker removal from the road of minor accidents and breakdowns means drivers would find themselves sitting in long traffic jams less often, this in turn means less wear and tear on vehicles, and lower fuel costs: [though these may not be that significant for one individual.]

C. These changes could make a real difference to the everyday experience of being out on the road and the way we think about it. When you see someone clearly behaving badly: [for instance- illegally using a bus lane] it can be very frustrating to see them actually benefiting from it, the law-abiding sit in the queue, the law-breaker sails straight past. It does make a difference knowing that these people are not going to get away with it.

D. Many drivers also get much stressed while driving; some feel quite vulnerable especially if they are being intimidated by the aggressive behaviour of others. Some people might worry about having an accident or breaking down, and having to cope on their own but with road supervisors help should never be that far away. There are many things which could be done to make driving a much more pleasant experience and to give people a greater sense of control in their lives.

E. Also, by inducing this method, we reduce the risk of the drivers and passengers by a considerable amount. This technique is inexpensive and largely successful and effective too.

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