



RADIO CORPORATION PTY. LTD.

DIVISION OF ELECTRONIC INDUSTRIES LTD.
126-130 GRANT STREET, SOUTH MELBOURNE, S.C.4.

TECHNICAL BULLETIN

BULLETIN E-2

File: Interference
Elimination.

Date: 26/2/46.

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SUBJECT--Elimination of Tyre or Brake Static Interference.

General:

This type of interference is the cause of many complaints of noisy reception and is becoming increasingly objectionable due to the extremely high sensitivity used in present day auto radio receivers, and to the use of under-car antenna systems required on steel top cars. In many cases the interference level is sufficiently high to make the use of the auto radio impractical or to confine it to reception from nearby powerful stations.

The intensity of the noise is usually greater on a dry, sunny day and varies with car speed, independent of engine speed, and according to the type of road driven on. Concrete or asphalt highways cause more interference than gravel or dirt roads.

Causes:

Tyre or brake static is due to an electrostatic charge developed on all four wheels of a car resulting from the friction and flexing of the tyres when coming in contact with the road.

The majority of the wheel static is generated by the front wheels due to the fact that they are practically insulated by the front wheel bearing lubricant.

Under-inflation of the tyres will increase the interference, due to the greater amount of flexing at the point of contact between the tyre and road surface.

White side wall tyres produce more interference due to the higher zinc content of the tyres.

Under-car antennas used on steel top cars and roadsters are more susceptible to this interference than roof antennas, due to their proximity to the points of interference radiation.

Diagnosis:

First determine if the noise is actually caused by brake or tyre static. This may be done as follows: Tune the radio off station and turn the volume control on full so that set will be operating at maximum sensitivity. The car should then be accelerated to a fair rate of speed and the engine shut off and the clutch disengaged. If the wheels are producing static it will be heard in the speaker as a periodic discharge in time with wheel rotation. If pressing on the brake pedal while the car is in motion eliminates the noise, it is conclusive proof that the noise is wheel static.

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The application of the brakes in most cases causes the static charge present in the wheels to be absorbed into the car body. The car body itself has enough radiating surface so that it does not become sufficiently charged to cause further discharge of static electricity, with resulting interference to radio reception.

In cases where the application of brakes does not eliminate the static, a test can be made which will give definite proof as to whether the wheels are the cause of the trouble. Splash water over each of the wheels and tyres and then drive the car on the same road on which the noise was previously noticed. The water will prevent the static electricity from developing and will eliminate all of this interference from the radio. The water on the wheels and tyres dries off very quickly and this test must be made as fast as possible.

Remedies:

The static charge present in the wheels can be absorbed into the car body by means of small grounding springs or brushes called "static collectors" operating between the stationary and rotating parts of the wheel assemblies. On the front wheels the static collectors invariably are operated between the centre or lathe hole in the axle shaft and the dust cap (not the hub cap) of the wheel. Several methods of grounding the rear wheels are employed to eliminate static from this source.

Static Collector Application:

Static collector springs or brushes have been designed for eliminating static originating from the front wheels of most cars.

Static Collectors should be installed in the front wheels of every car at the time of the radio installation. This should be done regardless of whether or not any interference is evident as experience has shown that brake static invariably develops where the static is not evident at first.

Severe Cases:

Several cases have been found where the installation of static collectors failed to eliminate the wheel static. Investigation disclosed that for the most part the static collectors were not making good connection, or were incorrectly installed. It is suggested in this case that the hub and dust caps be removed from the front wheels and the static collectors inspected for spring tension and contact.

Also the outer edge of the dust cap should be cleaned to insure a good ground connection.



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If after rechecking the installation of the front wheel static collectors the interference still persists, the "water test" previously mentioned should be made on one wheel at a time as it will be found the trouble can be isolated in one wheel.

In some cases the cause of the complaint has been found in the removable metal rims which may be insulated from the wheel by paint or rust. This may be remedied by insuring a good contact between the wheel and removable rim.

If the offending wheel has been previously checked for the correct installation of the static collector (where used) the trouble is undoubtedly in the tyre. Remove the tyre and examine the inside of the casing and you may find a small area which is painted with a special tyre cement. Completely remove this cement with benzine and a wire brush and thoroughly clean the inside of the casing and reinstall the tyre. This procedure will eliminate interference caused by friction between the tyre casing and the tube.

Where foreign matter cannot be located on the inside of the tyre casing it will be necessary to replace the tyre as it probably has too high a carbon content, and causes more static to be developed than can be eliminated by known methods.

In extreme cases, it will be necessary to use an antenna which is outside of the field of radiated interference.