

**REQUEST FOR BOARD ACTION**

**HENDERSON COUNTY  
BOARD OF COMMISSIONERS**

**MEETING DATE:** July 16, 2014

**SUBJECT:** Engine Compression Brake Discussion

**PRESENTER:** Toby Linville

**ATTACHMENTS:** Yes

1. Compression Brake Information
2. E-mail from NCDOT
3. Draft Un-Muffled Engine Compression Brake Standard
4. Town of Fletcher Ordinance Fanning Bridge Rd.

**SUMMARY OF REQUEST:**

The Code Enforcement Services Department has received numerous complaints from residents along Highway 64 concerning excessive noise from truck compression brakes. These residents have requested the Board consider an ordinance prohibiting compression brakes along portions of Highway 64.

**BOARD ACTION REQUESTED:**

The Board is requested to hear staff's presentation on the matter, discuss the available options, and to direct Staff accordingly.

**SUGGESTED MOTION:**

*No motion suggested.*

## **COMPRESSION BRAKE INFORMATION**

A compression release engine brake, frequently called a Jake brake or Jacobs brake, is an engine braking mechanism installed on some diesel engines. When activated, it opens exhaust valves in the cylinders after the compression cycle, releasing the compressed air trapped in the cylinders, and slowing the vehicle. Although *Jake brake* properly refers to the Jacobs brand of engine brakes, the term has become a generalized trademark and is often used to refer to engine brakes or compression release engine brakes in general, especially on large vehicles or heavy equipment.

## **FUNCTION**

When the driver releases the accelerator on a moving vehicle powered by a diesel engine, the vehicle's forward momentum continues to turn the engine's crankshaft, drawing air into the cylinders as the pistons move down and compressing that air as the pistons move back up. The pressure of the compressed air pushes back on the up-going pistons, tending to slow the vehicle. But, without a compression release mechanism, as the piston passes through top dead center and heads back down again, the compressed air in the cylinder acts as a spring and pushes the piston down, returning most of the work done in compression back to the crankshaft, creating very little braking effect. The engine turns freely and the vehicle coasts.

When a compression release engine brake is active, a valve releases the pressure from the cylinder before the piston starts back down, so the slowing effect is present on the up stroke, but no accelerating effect is present on the down stroke and the net effect is the vehicle slows down. The driver controls consist of an on/off switch and, sometimes, a multi-position switch that controls the number of cylinders on which the brake is active. When the driver has turned on the compression release engine brake, it will activate when the driver releases the accelerator. There are also switches on the clutch and accelerator pedals that deactivate the compression brake when the driver disengages the clutch or presses the accelerator.

## **LEGISLATION**

The use of compression release engine brakes may cause a vehicle to make a loud chattering or "machine gun" exhaust noise, especially vehicles having high flow mufflers, or no mufflers at all, causing many communities in the United States and Canada to prohibit compression braking within municipal limits. Drivers are notified by roadside signs with legends such as "Brake Retarders Prohibited," "Engine Braking Restricted," "Jake Brakes Prohibited," "No Jake Brakes," "Compression Braking Prohibited," "Limit Compression Braking," "Avoid Using Engine Brakes," or "Unmuffled Compression Braking Prohibited," and enforcement is typically through traffic fines. Such prohibitions have led to the development of new types of mufflers and turbochargers to better silence compression braking noise. Jacobs claims that the use of Jake Brakes on signs prohibiting engine retarding brakes violates their trademark and discriminates against Jacobs brand products.

**From:** Galloway, David D [<mailto:ddgalloway@ncdot.gov>]  
**Sent:** Tuesday, June 10, 2014 6:28 PM  
**To:** Toby Linville  
**Cc:** Cook, Scott E; Cannon, Steven L  
**Subject:** RE: Question

Mr. Linville,

After reviewing this portion of US 64 and discussing this issue with Department administrators, it would be the NCDOT's recommendation for the county sheriff's department to target the overly loud trucks that are using this portion of US 64 and cite any trucks that have unmuffled, altered, or defective muffler systems. The NC law that pertains to exhaust systems and emissions control devices is GS 20-128. Based on my discussions with Kevin Lacy, State Traffic Engineer as well as in my limited research, it appears that most of the truck noise complaints that jurisdictions receive from local residents and businesses are actually being caused by trucks with illegal muffler systems. Thus, targeting these trucks should reduce the amount of noise that is being emitted by large trucks.

We are in the approval process of adopting a standard practice that would allow cities and counties to install "UNMUFFLED ENGINE BRAKING PROHIBITED" signs on state system roadways through an encroachment agreement. These signs would not require an ordinance because they are backed by General Statute 20-128. This is an option that the department would consider allowing the county to pursue on this portion of US 64. However, one word of caution with installing signs of this type is that in many instances, these type signs without active and consistent enforcement can lead to an increase in the use of compression engine brakes. Thus, it would be critical that the county sheriff's department routinely patrol and enforce General Statute 20-128.

The Department would be against the total prohibition of compression brakes due to the fact that truckers may have a need to use their engine brakes as a safety precaution as they traverse the long moderate downgrades and sweeping curves that are prevalent along this portion of US 64.

It is our opinion that a total ban on engine/compression brakes along this section of roadway could adversely affect the safety of the traveling public as well as adjacent property owners.

Please let me know if the county would like to look further into the option of installing "Unmuffled Engine Braking Prohibited" signs and I will get you additional information as soon as the standard practice is adopted, if not beforehand.

If you have any questions, please let me know.

D. D. "Bucky" Galloway, P.E., CPM  
NCDOT-M & S Division-Traffic Safety Unit  
Western Region Field Operations Engineer  
Phone #: 828-650-2700

Division of Highways  
Transportation Mobility and Safety Division  
**DRAFT Standard Practice**  
**for**  
**County/Town/City, North Carolina to**  
**Sign for Unmuffled Engine Compression Brakes**

The establishment of an unmuffled engine compression brake sign to any internal combustion engine powered vehicle, operated on any posted roadway way within the County/Town/City limit while said vehicle or operator is utilizing an engine brake, exhaust brake or similar without an equipped muffler, or other exhaust system in good working order and in constant operation to prevent excessive or unusual, noise and/or vibration, except when the use of such engine, exhaust, or compression brake is necessary for the safe operation of the vehicle.

Establishment of a sign is not required for law enforcement to enforce G.S 20-128: “Exhaust system and emissions control devices”. The Transportation Mobility and Safety Division (TMSD) considers engine braking an essential piece of equipment and prohibiting their use may have negative impacts. However, a properly installed muffler will reduce the excessive noise and vibration emitted; therefore the Department will allow the installation of “Unmuffled Engine Braking Prohibited” signs on the Right of Way inside municipal limits. Additional criteria will be required for establishment of these signs outside a municipal limit.

**PURPOSE:** The purpose of this standard practice is to provide guidance for an Unmuffled Engine Compression Brake signs within the County/Town/City. The compliance of these signs is analogues with installation of a no speeding sign.

**DEFINITIONS:** For the purpose of this section, the following words and phrases shall have the following meanings:

1. Unmuffled engine compression brake: a motor vehicle brake which is activated or worked by the compression of the engine of a motor vehicle, and which in not effectively muffled to prevent excessive noise.
2. Engine compression brakes: a device primarily on large trucks for the conversion of the engine from an internal combustion engine to an air compressor for the purpose of braking without the use of wheel brakes (commonly referred to as a “Jake” brake, Jacobs brake)

**Section 1: Rules and Regulations**

This ordinance is to establish guidance in the interest of public safety.

1. It shall be unlawful for any person to operate or cause to be operated a motor vehicle unless the exhaust system is free from defects, which affect sound reduction.
2. No person shall remove or render inoperative, or cause to be removed or rendered inoperative, other than for purposes of maintenance, repair or replacement, any muffler or sound dissipative device on a motor vehicle.
3. It shall be unlawful for any person to modify the exhaust system of a motor vehicle by the installation of a muffler cut-out or bypass, and no person shall operate a motor vehicle which has been so modified.
4. The Town/City will identify the areas that compression braking is prohibited and signs can be posted within the Department’s right-of-way stating “UNMUFFLED ENGINE BRAKING PROHIBITED”.
5. This sign shall not apply to emergency driving situations requiring the utilization of an engine or exhaust brake to protect the safety and property of motor vehicle operators,

pedestrians, and the operator and passengers of the motor vehicle involved in said emergency situation.

6. A NCDOT encroachment agreement is required for any request for signs located outside of a municipality. The payment of sign, installation, and sign maintenance will be the responsibility of the requestor. Signs must be installed by a NCDOT approved contractor. The sign design will be provided by the North Carolina Department of Transportation.

7. The County/Town/City will be responsible for adoption of the ordinance, payment of sign, installation, enforcement, and sign maintenance. The sign design will be provided by the North Carolina Department of Transportation.

### **GS 160A-187: “Noise Regulation”**

A city may by ordinance regulate, restrict, or prohibit the production or emission of noises or amplified speech, music, or other sounds that tend to annoy, disturb, or frighten its citizens. (1971, c. 698, s. 1; 1973, c. 426, s. 25.)

### **GS 20-128: “Exhaust system and emissions control devices”**

(a) No person shall drive a motor vehicle on a highway unless such motor vehicle is equipped with a muffler, or other exhaust system of the type installed at the time of manufacture, in good working order and in constant operation to prevent excessive or unusual noise, annoying smoke and smoke screens.

(b) It shall be unlawful to use a "muffler cut-out" on any motor vehicle upon a highway.

(c) No motor vehicle registered in this State that was manufactured after model year 1967 shall be operated in this State unless it is equipped with emissions control devices that were installed on the vehicle at the time the vehicle was manufactured and these devices are properly connected.

(d) The requirements of subsection (c) of this section shall not apply if the emissions control devices have been removed for the purpose of converting the motor vehicle to operate on natural or liquefied petroleum gas or other modifications have been made in order to reduce air pollution and these modifications are approved by the Department of Environment and Natural Resources. (1937, c. 407, s. 91; 1971, c. 455, s. 1; 1983, c. 132; 1989, c. 727, s. 9; 1997-443, s. 11A.119(a); 2000-134, s. 6.)

### **40 CFR 202.20: STANDARDS FOR HIGHWAY OPERATIONS.**

§ 202.20 Standards for Highway Operations.

(a) No motor carrier subject to these regulations shall operate any motor vehicle of a type to which this regulation is applicable which at any time or under any condition of highway grade, load, acceleration or deceleration generates a sound level in excess of 86dB(A) measured on an open site with fast meter response at 50 feet from the centerline of lane of travel on highways with speed limits of 35 MPH or less; or 90 dB(A) measured on an open site with fast meter response at 50 feet from the centerline of lane of travel on highways with speed limits of more than 35 MPH.

(b) No motor carrier subject to these regulations shall operate any motor vehicle of a type to which this regulation is applicable which at any time or under any condition of highway grade, load, acceleration or deceleration generates a sound level in excess of 83 dB(A) measured on an open site with fast meter response at 50 feet from the centerline of lane of travel on highways with speed limits of 35 MPH or less; or 87 dB(A) measured on an open site with fast meter

response at 50 feet from the centerline of lane of travel on highways with speed limits of more than 35 MPH. [39 FR 38215, Oct. 29, 1974, as amended at 51 FR 852, Jan. 8, 1986]

## **TOWN OF FLETCHER ORDINANCE**

### **§ 70.06 ENGINE COMPRESSION BRAKES PROHIBITED ON FANNING BRIDGE ROAD.**

(A) No person shall use a motor vehicle on Fanning Bridge Road where the engine compression brake is in any way engaged or activated on the motor vehicle or any unit a part thereof, except for emergency situations for the purpose of avoiding a collision with another object, person or vehicle.

(B) ***ENGINE COMPRESSION BRAKES*** means a device primarily on trucks for the conversion of the engine from an internal combustion engine to an air compressor for the purpose of braking without the use of wheel brakes.

(C) Any person violating the provisions of this section shall be guilty of a Class 3 misdemeanor and upon conviction shall be punished in accordance with § [10.99](#).  
(Ord. O-13-06, passed 4-8-2013)