

IMPROVING THE BRAKE SYSTEM

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Abstract: This article provides instructions on how to improve brake systems. It partially covers methods and causes of brake system problems. It also provides recommendations for keeping your car's brake systems working properly.

Key words: brake, speed, brake mechanism, tread, caliper piston, caliper, disc, pad, brake hoses, brake pedal.

You can improve the brake system by installing reinforced components (perforated discs, sports pads, reinforced hoses, multi-piston calipers) or by proper maintenance and adjustment (bleeding the system, cleaning the brakes, using high-quality fluid). The choice depends on the goals: for everyday driving, high-quality components and regular maintenance are sufficient, and for sports mode, more serious tuning is required.

Main areas of improvement:

1. Replacing components with more efficient ones:

Brake discs:

Installing large-diameter perforated or ventilated discs improves cooling, prevents overheating and reduces wear.

Brake pads:

Sports pads have an increased coefficient of friction, which reduces the braking distance and works better at high temperatures.

Calipers:

Multi-piston calipers (4, 6 or more) distribute pressure on the disc more evenly, reduce vibration and increase braking force.

Brake hoses:

Reinforced (braided) hoses with metal braiding are more resistant to pressure and deformation, which makes braking more informative.

2. Maintenance and modification of the system:

Bleeding the brake system:

Removing air from the system increases the pressure, which makes the brake pedal more sensitive and effective.

High-quality brake fluid:

Using high-quality synthetic compounds with a high boiling point reduces the risk of vapor lock and corrosion.

Maintenance of brake components:

Regular cleaning of discs and pads helps keep them in perfect condition and improves grip.

3. Improving the cooling system:

Increased disc diameter:

A larger contact area with the pads provides more effective braking.

Ventilation:

Perforated discs with holes and special ventilated discs contribute to better heat dissipation.

Important to consider:

Purpose of use:

High-quality standard components or light tuning are suitable for city driving, while more powerful systems are suitable for the track.

Compatibility:

Often, when tuning brakes, it is necessary to change other components, for example, calipers and discs will require the installation of larger diameter discs, which may require increasing the size of the wheels.

Quality of components:

Choosing kits from well-known manufacturers ensures reliability and improved system performance.

Optimal performance of the braking system is achieved with the ideal interaction of all its components, especially the brake pads and discs.

During braking, the pad can heat up to extreme temperatures reaching 1000°C, which, combined with high forces and stresses, has a significant impact on its wear and the condition of the brake

discs.

A car brakes poorly, noise, vibrations appear, or braking efficiency decreases - signals the need to inspect the brake discs.

Pads not braking well

Common problems associated with brake discs and pads include:

Disc thickness variation (DTV), which causes pulsation during braking, caused by uneven disc wear and caliper malfunctions.

Blue film on discs, which increases braking distance, can be caused by constantly tightening the brakes, sticking brake pads, intensive driving with an overloaded vehicle, driving in mountainous areas or aggressive driving.

Grooving on the disc surface, which increases brake noise and reduces braking efficiency, can appear due to the use of excessively hard pads or soft disc material. Corrosion and dirt between the pad and disc also contribute to the formation of grooves.

Brake disc corrosion not only increases braking noise, but also affects the braking characteristics. The main causes of corrosion include adverse weather conditions, long periods of inactivity of the car and exposure to aggressive chemicals from poor quality brake pads.

Brake and Clutch Cleaner

To prevent corrosion of brake discs and keep them in perfect condition, we recommend using a specialized brake and clutch cleaner. This product helps to effectively remove dirt, dust and chemical deposits that promote corrosion, thereby extending the service life of the discs and improving braking efficiency.

Shake the brake cleaner can before use to mix the contents well.

Direct the nozzle of the aerosol to the visible part of the brake disc and pads. Spray the cleaner evenly from a distance of 15-20 cm, trying to cover as much of the brake system as possible.

After spraying, give the product some time to work, usually a few minutes is enough to dissolve dirt and oil. The cleaner should evaporate on its own, leaving no residue.

Repeat the spraying procedure if necessary for deeper cleaning. How to improve brake efficiency

REFERENCES

- [1]. Jianqiang Gong, Yaping Luo, Zhaowen Qiu, Xiangdong Wang's Determination of key components in automobile braking systems based on ABC classification and FMECA, Journal of Traffic and Transportation Engineering (English Edition), 2022; 9(I): 69-77
- [2]. Shoaib Munir Mulani, Ashwani Kumar, Haris Naiyer, E Azam Shaikh, Ashish Saurabh, Pravin Kumar Singh, Piyush Chandra Verma A review on recent development and challenges in

automotive brake pad-disc system , journal Materials Today Proceedings · July 2022.

[3]. S.P. Jadhav, S.H. Sawant Development of novel friction material for vehicle brake pad application to minimize environmental and health issues, journal Materials Today Proceedings • July 2019.

[4]. Sobirov M.M., Xaydarov M.A. Avtomobillar tormozining ekspluatatsion muammolari, “O‘zbekistonda avtomobil transportini rivojlantirish istiqbollari: Loyihalash, ishlatish va logistika” mavzusida xalqaro ilmiy-texnik anjumani 2024 yil 15-16-noyabr 659-691 betlar

[5]. Q.H. Azizov. “Yo‘l transport hodisalarini tizimli tahlili” o‘quv qo‘llanma Toshkent 2022 y. – 47 b.

[6]. Q.H.Azizov “Harakat xavfsizligini tashkil etish asoslari” ,Toshkent 2009-yil, 49-bet

[7]. Babai,M.Z., Ladhari, T., Lajili, I., 2015. On the inventory performance of multi-criteria classification methods: empirical investigation. International Journal of Production Research 53 (1), 279-290.

[8]. H.A.C. Denier van der Gon, M.E. Gerlofs-Nijland, R. Gehrig, M. Gustafsson, N. Janssen, R.M. Harrison, J. Hulskotte, C. Johansson, M. Jozwicka, M. Keuken, K.

Krijgsheld, L. Ntziachristos, M. Riediker, F.R. Cassee, The policyrelevance of wearemissions fromroad transport, nowand in the future-an internationalworkshop report and consensus statement, J. Air Waste Manag. Assoc. 63 (2) (2013) 136–149, <https://doi.org/10.1080/10962247.2012.741055>

[9].] M. Arman, S. Singhal, P. Chopra, M. Sarkar, A review on material and wear analysis of automotive Break Pad, Mater. Today Proc. 5 (14) (2018) 28305–28312, <https://doi.org/10.1016/j.matpr.2018.10.114>

[10]. Kukutschová, V. Roubíček, M. Mašlán, D. Jancík, V. Slovák, K. Malachová, Z. Pavlíčková, P. Filip, Wear performance and wear debris of semimetallic automotive brake materials, Wear 268 (1–2) (2010) 86–93, <https://doi.org/10.1016/j.wear.2009.06.039>

[11]. H. Hagino, M. Oyama, S. Sasaki, Laboratory testing of airborne brake wear particle emissions using a dynamometer system under urban city driving cycles, Atmos. Environ. 131 (2016) 269–278, <https://doi.org/10.1016/j.atmosenv.2016.02.014>.

[12]. M. Alemani, O. Nosko, I. Metinoz, U. Olofsson, A study on emission of airborne wear particles from car brake friction pairs, SAE Int. J. Mater. Manuf. 9 (1) (2016) 147–157, <https://doi.org/10.4271/2015-01-2665>.