

**FAX**  
**written to Mr. Jerie on 10.06.2002**

**From TIRSAN TREYLER SAN. TIC. VE NAK. A.S. / TURKEY**  
**Tel: +90 216 311 71 61**  
**Fax: +90 216 311 99 01**  
**E-Mail: fehirb@tirsan.com.tr**

**Subject: Application of Disc Brakes and EBS Systems on HGV Combinations**

Dear Mr. Jerie,

As disc brakes for trailers were first introduced six years ago, they were respected as state-of-the-art technology and they caused many different expectations to arise. It was claimed that the disc brake would replace the drum brake in high proportion.

Unfortunately, the problems encountered today reflect opposite results in practice. Producers of motor vehicles, trailers and braking systems do not assume any responsibility and users are left alone with their problems.

After detailed investigations especially about premature wear problems, which our customers are encountering, we decided to share our following opinions with you:

- 1) Disc brakes, in comparison to drum brakes, are more sensitive against imbalanced distribution of the braking effect among the axles of the whole combination. Greater braking force causes rise of temperature and elevated temperature expands the brake disc, which then provides increased braking power and thus suffer from higher temperature and wear rate.
- 2) Excessive use of disc brakes produces high temperatures, which can cause damage on neighbouring equipment. Sensors and cables of the anti-lock system and protection bellows of calliper guides are melting. It is not unlikely, that high temperatures capable of damage on tyres can be reached.
- 3) Disc brakes, contrary to drum brakes, do not give a warning to the driver about the safety of the next braking action. Additionally, the through rising temperature expanded disc shows higher braking effect. But the brake pads and disc wear in an accelerated rate, pads occasionally wear off completely and a metal-to-metal friction takes place. The driver has no possibility of recognition, whether there is enough thickness of pads for the next safe braking. Pad wear sensors, which are generally standard on motor vehicles, are offered as option for trailers, but displays of those can only be mounted on the trailer, which can not be observed from the driver's seat.
- 4) Being the ruled unit in the combination, trailers accept the dominance of the motor vehicle about the distribution of braking effect. The motor vehicle is responsible of balanced braking because of this dominance.
- 5) Motor vehicles can transfer some braking effect to trailers, either by predominance adjustment on the trailer control valve (conventional brake systems, ABS and LSV), or by coupling force control (CFC) algorithm (electronic brake systems, EBS).
- 6) In mixed use of drum and disc brakes on motor vehicles and trailers, disc brakes suffer from higher wear, because of different heat fading characteristics of both systems.

The rules regarding above must be looked over and producers of motor vehicles, trailers, axles and braking systems must work out a common sense. Our opinion is as follows:

- 1) The range of braking effect distribution (EC band) has to be narrowed or a rule must be established, that limits the difference of braking effect between the towing and the towed vehicle.
- 2) Design, test and approval of the disc brakes should be governed by rules, which under any application circumstance does not permit the excessive heat build-up. Moreover, the trailer disc brakes must remain in safe side, also in case only they deliver the total braking power for the whole combination.
- 3) The driver must be warned audibly and/or visually, when the temperature of brakes exceed a standard high value.
- 4) It is natural that the motor vehicle is the decisive authority on braking effect distribution, as it is the decisive authority for moving the combination. But the trailer must be permitted to record its share on the total braking effect.
- 5) The transfer of braking effect from the motor vehicle must be recorded similar to recording of vehicle speed. In that way, one can control, how much braking effect is taken by each member of the combination. Additionally, the actual predominance of the trailer control valve can be displayed to the driver by means of a pressure gauge on the dashboard.
- 6) As every motor vehicle can tow every trailer, every trailer can be towed by every motor vehicle. This is a principal rule. The individual vehicles of the combination must not place extra tasks to each other. Moreover, they cannot take actions, which damage the other's brake systems. For combining two vehicles, which individually fulfil the legislative requirements about braking, there must be no further requirements. If necessary, the legislation in force must be adapted, so everybody knows his responsibility by law. Today some axle and trailer manufacturers require additional conditions such as compatibility tests and predefined air pressure ranges for combinations. Otherwise no liability about brakes is accepted.

Studies and decisions, which already have been made, must urgently be made public to prevent the waste of sources through excessive wear and to guarantee the safe braking on the road.

An independent authority must declare the responsibilities of

- the motor vehicle manufacturer
  - the trailer manufacturer
- and
- the user.

We feel obliged to make a statement of our experience gathered from a number of cases of deficiency. Additionally, we require all the related information in your possession.

We are looking forward to receiving your reply in shortest possible time.

Best regards,

T I R S A N A . Ş .

A. Fehir BULUTLAR

*Vice President*