DISC OR DRUM?

Although disc brakes appear to have won the popularity contest in motor vehicles generally, drum brake technology is hanging on in certain CV sectors. Buyers face a trade-off between capital cost and weight. By Chris Tindall

All over the world, countless numbers of disc brakes are specified in a wide range of vehicles. Unlike them, however, the UK market continues to hang on to drum brakes in some applications. "Today, the majority of trucks and buses, as well as many trailers and semi-trailers, come equipped with disc brakes," according to a spokeswoman for brake friction supplier Lumag.

Clearly, both have their advantages and disadvantages. According to Lumag, drum brakes, owing to their compact structure and installation in an enclosed operating space, reduce penetration of contaminants that usually lower the friction coefficient.

But that's not the only factor. A Knorr-Bremse spokeswoman says: "Safety is, of course, the main priority for all wheel brakes: the required braking force must be generated at all times and effectively transferred to the wheel to bring the vehicle to a safe stop. Certain aspects of the disc brake design give it an advantage over drum brakes in this respect. It is particularly superior in terms of brake fade... particularly on downhill gradients by reducing the braking distance compared with drum brakes."

Although the Lumag spokeswoman agrees that drum brakes can fade, and that disc brakes can generate higher braking torque than drum brakes, she argues that because disc braking torque remains more stable than drum, long and repeated braking can lead to excessive brake disc heating.

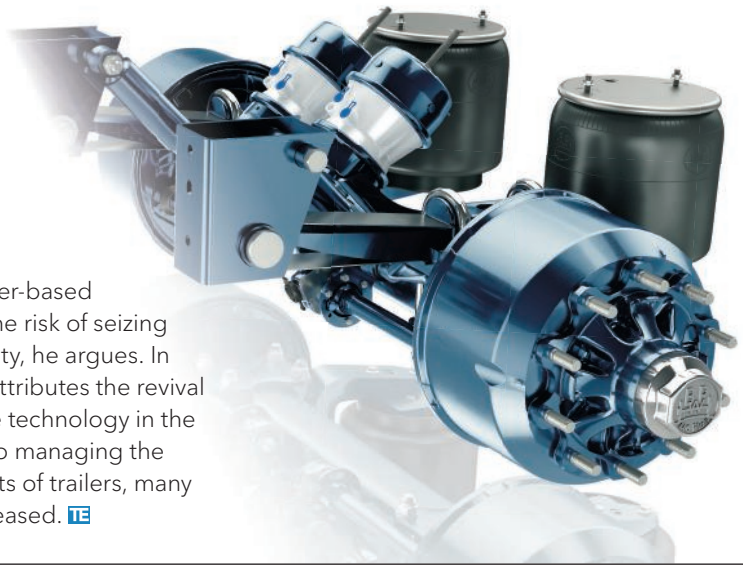
Brake temperatures are a key issue, argues Roger Thorpe, engineering manager at BPW, who seems to struggle to imagine an application unsuitable for a drum brake (although BPW does also supply disc models). He contends: "Disc brakes can be lighter than the equivalent drum brake and are very often used on spirit tankers for that reason. In general terms, disc brakes are built with less material and consequently tend to run with higher temperatures – circa 200°C to 250°C against 150°C for drum brakes – so the amount of absorbed energy during a braking event has to be more carefully controlled to ensure that friction surfaces do not overheat."

The weight advantage of disc is emphasised by WABCO and Knorr-Bremse. The former promotes the benefits of its new model, the single-piston ADB Maxx range (pictured, inset, above). WABCO chief engineer

BPW BREAKS IT DOWN

BPW's Roger Thorpe offers some pointers about trailer construction for specifying braking systems.

- **Type and size of wheels: are there any features around the wheels that will reduce or impede air flow?**
- **Type of suspension: conventional sprung-type suspension or a suspension fitted with cast trailing arms?**
- **Type of trailer chassis design**
- **Type of axle geometry, including number, spread and location in the bogie**
- **Type and use of trailer: what style of body will be fitted to the trailer?**
- **Type of loading pattern: will it vary?**



Hans-Christian Jungmann says that the model's design cuts down on a vehicle's weight by up to 30kg per axle, and also boosts fuel efficiency and contributes towards reducing drag torque. "Running costs, particularly whole life costs, are important factors. Trucks and trailers are an investment and have to earn money for the vehicle operator on a daily basis."

On that point, everyone is agreed. Also in accord on another point – that disc brakes are more expensive than drum – are Lumag, BPW and PSV parts distributor Imperial Engineering. Thorpe at BPW claims that the overall cost of ownership of a disc-braked vehicle over five or six years is greater than a drum-braked vehicle (BPW model pictured, right).

ON THE BUSES

In contrast to parts of the HGV sector, where drum brake technology has seen a resurgence, all new buses destined for the UK market are 100% disc brake-based, states John Dwight, Imperial Engineering sales director. He continues: "This poses a challenge for operators managing whole-life costs in this highly safety-focused area, as the components in a disc-based system are inherently more expensive than those in drum-based systems. Minimising whole life costs and maximising the service life of braking system components and calipers in particular, is a key issue for PSV operators under increasing cost pressure due to declining subsidies. To put this into context, a set of four OEM bus calipers can cost between £1,000 and £3,000, depending on the vehicle."

While Knorr-Bremse states that modern pneumatic disc brakes are the right choice for trailers, Dwight disagrees. Because trailers can be left for some time while out of service, disc and caliper-based systems run the risk of seizing due to inactivity, he argues. In any case, he attributes the revival of drum brake technology in the HGV market to managing the whole-life costs of trailers, many of which are leased. TE