

Hydraulic trailer braking - Does it have a future?

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Hydraulic trailer braking is an established, low-cost design, which has been used in agriculture for the best part of 25 years. It's a simple self-lubricating system, which requires little maintenance.

The standard "no frills" hydraulic trailer braking system only actuates when the tractor foot brake is applied and the engine is running. This offers no emergency braking feature if the tractor brakes fail or the trailer becomes accidentally-disconnected from the tractor. A common problem within the industry is when tractors are pulling heavy loads up steep gradients, the tractor engine stalls & the operator then has no means of braking the whole combination. It then has the potential to run backwards at ever increasing speed.

To meet the new EU-proposed braking regulations "emergency braking" is required: the trailer brakes must be applied automatically in a break-away situation. Also if the tractor brakes fail, it must be possible to brake the trailer when seated in the tractor cab.

J H Milnes Ltd have designed and developed the "EUROSAFE" range of hydraulic trailer braking valves. The fail-safe emergency valve (see Fig.1) is a popular unit, being suitable for fitment to new trailers or retrofitting to existing vehicles. This dual-line system combines hydraulic brake pressure (service line) and an electrical signal (emergency line). The latter provides automatic application of the trailer brakes in the event of the trailer becoming detached from the towing vehicle. An Electro-Controller located inside the cab of the towing vehicle provides independent control of the trailer service brakes, allowing the operator to apply the trailer brakes and bring the tractor-trailer to a stop if the tractor brakes should fail or when parking.

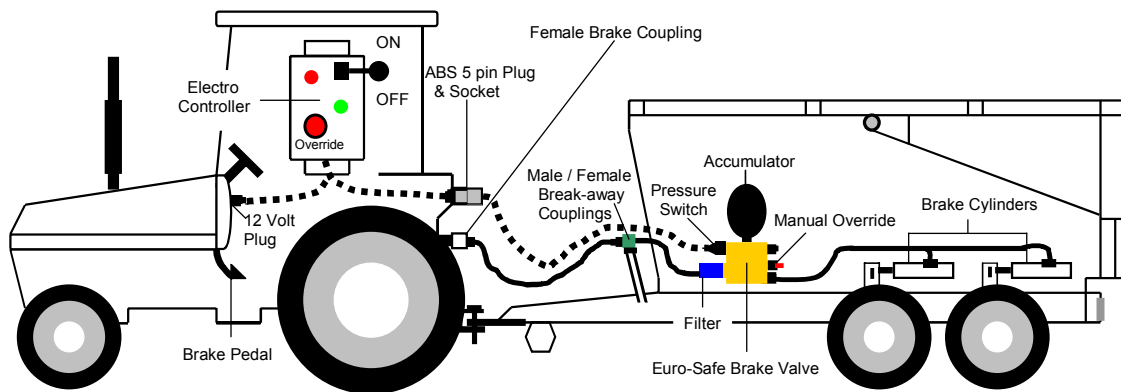


Fig.1 'Eurosafe' fail-safe trailer braking system



In the future EU-proposed tractor-trailer braking regulations are also likely to increase the trailer service braking performance requirement from 25% to 50% braking efficiency. To achieve this trailers will require bigger brakes to be fitted, but it will also be equally important to match the **correct** size (diameter) of hydraulic brake actuator to the appropriate brake lever length to suit the foundation brakes installed. Larger diameter brake rams are likely to be used to achieve the extra braking torque required. As a consequence, automatic load sensing will be required on trailers & other trailed equipment designed to carry varying loads, but machinery and implements with a fixed weight will not.

Hydraulic load sensing systems detect the load on the trailer axle or drawbar suspension and as a result control the trailer braking effort to suit the total weight of the trailer, which of course varies depending upon the load being carried. The aim is to control braking torque to prevent over-braking of the trailer, thereby preventing wheel lock, trailer swing and reducing tyre wear.

To meet future braking requirements we have developed a new combined failsafe emergency load sensing valve. This works in the same way as the standard failsafe emergency valve, but a load sensing valve is integrated within the unit. This allows easy fitment to all trailers and trailed equipment. Hydraulic ABS is also possible and we have units working successfully in the field. However, only time will tell if this will be a future (regulatory or market) requirement.



Fig.2 Hydraulic combined fail-safe emergency load sensing valve

The Future

As a trailer manufacturer: - The trailer will need to be fitted with an appropriate brake control system. This must be matched with the correct size of foundation brake, actuator (ram) & brake lever for the vehicle gross weight.

As a tractor manufacturer: - The tractor will require a system which can operate the trailer brake control system. This will include application of the trailer (service) brakes when the tractor handbrake is applied: an electrical power socket will also be required to operate the system.

As a user: - Adequate maintenance is required! When you have a complete brake control system it will be important to keep it properly maintained and adjusted on a regular basis.

These systems are available from a number of suppliers, but end-users must recognise the need to improve trailer braking system performance and install the equipment to do the job.