

Mechanical overrun-brake's weaknesses :



DESCENDING: Driving down-hill is an issue because the mechanical overrun-brake could be activated. This happens at a certain steepness and is speed dependant. It may occur on slopes steeper than 3%. On a slope the towing car may either use the engine to control speed or its brakes. If the slope is steep enough the overrun brakes of the trailer/caravan are activated continuously indifferent of how the towing car controls speed. The trailer brakes and bearings may be overheated as a consequence. Mechanical damage to the brakes and/or bearings could be the result. Apart from expensive repairs it could easily lead to malfunctioning of the brakes and/or the bearings, also at a later stage, creating dangerous situations.



REVERSING: It (sometimes) happens to be difficult to reverse because the brakes of the trailer or caravan tend to block. The automatic reverse in the brakes is meant as a solution. However this device requires proper handling. Prior to reversing, the brake shoes of the trailer/caravan should be released from the brake drums (overrun brake "stretched"). In case it is tried to reverse with the caravan-brakes blocked, severe damage may occur to the brakes of the trailer/caravan an/or the clutch of the car.



SWINGING TRAILER: In case the trailer/caravan starts to swing dangerously the speed of the combination should be reduced as quick as possible. This is the only way to stop the swinging. In such frightening situation with an oscillating trailer/caravan the combination should be decelerated immediately by hard pushing the brakes of the towing car.

UNREST, JIGGLING OF THE TRAILER: In the overrun brake-system an overrun damper is mounted. It's purpose is to dampen movements of the caravan behind the towing car and to prevent that the overrun brakes are slightly and repeatedly activated during normal drive. In practise the overrun damper is not able to completely stop the jiggling and one notices that in the car as unrest or instability.

Secondly the overrun damper is meant to smoothen the movements of the overrun brake mechanism when it is pushed-in (braking) or pulled out (accelerating).

ITBS offers a solution for overrun brake's weaknesses:

DESCENDING: In case the brakes of the towing car are not activated, **ITBS** keeps the overrun brake mechanism "stretched". The trailer/caravan may push forward against the trailer hitch, but **ITBS** prevents the activation of the overrun brake system. The engine of the towing car can be used to slow down instead of its brakes thus preventing the trailer's brakes to be activated. As soon as the towing car's brakes are activated, the blocking of the overrun brakes is ended and the trailer/caravan starts to brake too.

Consequently downhill the combination can use the engine of the towing car for speed-control without activating the brakes of the trailer/caravan. So these brakes are not heating up.

Depending the steepness of the slope the combination could need to use the brakes. As soon as the towing car uses its brakes, the trailer/caravan starts to brake too.

When the brake pedal of the car is released, the overrun brake of the trailer/caravan is "stretched" automatically and its brakes are released too.

A great advantage of **ITBS** is that there is no need to accelerate the car for stretching the overrun-brake system. Nobody appreciates acceleration on a narrow mountain pass!

The brakes of the trailer caravan get the same time to cool down as the brakes of the towing car.

REVERSING: **ITBS** automatically blocks the overrun brake during reversing. As described here-above **ITBS** blocks the overrun brake system when the towing car is not using its brakes.

ITBS does the same when the towing car is switched in the reverse gear and the reverse-lights are burning. In this case **ITBS** doesn't respond to the brakes of the towing car.

Prior to the reverse movement of the towing car, the overrun brake system is stretched by **ITBS**. It is easy to reverse with the stretched and blocked overrun brakes of the trailer/caravan.

It may happen, that the force to push the trailer/caravan backwards exceeds the maximum force **ITBS** can handle. Despite **ITBS** the overrun brake system is pushed-in and the reverse automate is properly activated. The trailer/caravan keeps on rolling backwards smoothly.

SWINGING TRAILER: **ITBS** continuously checks and analyses the movements of the trailer/caravan. In case the trailer/caravan starts to swing and the movements exceed the safety limits, **ITBS** automatically activates the brakes of the trailer/caravan. Also the brake-lights are activated in order to warn the traffic behind. The braking force of the trailer/caravan changes the swing properties of the trailer/caravan and the swinging is terminated. If the situation is within the safety limits again, the trailer/caravan brakes are released.

From a theoretical point of view the speed of the combination is reduced when **ITBS** activates the brakes. It is important to reduce speed yourself after such an occurrence in order to drive at a safer speed for the combination.

In case **ITBS** is taking action as response to dangerous swinging, the driver is warned by a bright, flashing LED in the Remote Control Plug. It is important to be aware, that dangerous swinging of a trailer/caravan is mainly due to a too high speed in combination with loading of the towing car and the trailer/caravan.

JIGGLING: **ITBS** fully prevents jiggling of the trailer/caravan behind the towing car. The trailer/caravan is frequently pushed forward (a little) during normal drive caused by air-turbulence due to wind-shifts, trucks, busses etc. During normal drive **ITBS** stretches the overrun brake system and blocks movements in the overrun brake mechanism. The combination of the towing car and the trailer/caravan behave thus as one unit.



ITBS Integrated Trailer Brake System

- **ITBS** relaxes driving as it automatically terminates swinging of the caravan
- **ITBS** helps to descend mountains hassle free without over-heated brakes
- **ITBS** eases reversing with the caravan
- **ITBS** enhances driving-comfort because the caravan is not jiggling
- **ITBS** saves repair and costs because less wear of the brakes of the caravan
- **ITBS** is a high-tech enhancement of the traditional brake-system of the caravan
- **ITBS** earns itself back in cost-savings and trade-in value
- **ITBS** is developed by Triorep, the Dutch authority in trailers

What may be improved in traveling with the caravan?

The caravan driver's nightmare is the towed caravan uncontrollably starts to swing. Worst case scenario is a crash of the combination.

Out of control swinging may be induced by higher speeds, when loaded incorrectly, side-wind turbulence, bumps in the road etc. The out of control swinging may be started by overtaking trucks or busses (or vice versa) too.

Without an anti-swing system like **ITBS** the only way-out is heavy braking and hoping for the best.

Everybody, experienced in towing trailers equipped with mechanical brakes as caravans are, is familiar with the reliability of the mechanical overrun brakes. However they will have experienced some weaknesses of the system too.

When descending long slopes the caravan brakes are activated continuously, also when the towing car is slowing down on the engine. In such case the caravan brakes may be over-heated with risk for failure. The only way to cool down the brakes is interrupting the descend and stopping at a parking place.

Reversing the combination should be done with care. The overrun brake may block when the automatic reversing system is not initiated correctly. The caravan brakes or the car's clutch could be severely damaged.

ITBS Integrated Trailer Brake System

traveling in safety is in everyone's interest

ITBS, the “integrated Trailer Brake System” is an automatic, electro-pneumatic control system for trailers with mechanical brakes such as caravans. The mechanical overrun brakes are powered actively by the pneumatic system.

ITBS electro-pneumatic device has a very fast response. The pneumatic cylinder powers the overrun brake such that the caravan’s brakes are activated when needed (uncontrollable swinging) or the brakes are blocked if braking of the caravan should be avoided.

Swinging

The protection against swinging is an important safety function of **ITBS**. The electronic acceleration sensor continuously monitors the movements of the caravan. In case the acceleration due to swinging exceeds the safety-limit, **ITBS** activates the brakes of the caravan and the caravan’s brake-lights flash on. Automatically the combination is “stretched”. As a consequence the resonance frequency of the oscillation is altered resulting in termination of the swinging of the caravan. As soon as the swinging of the caravan is less than the safety-limit the brakes are released again.

!! In such case it is important to reduce the speed of the combination. **ITBS** definitely is not a device that enables faster driving than the combination is safely able to!!!

Overrun brake

ITBS compensates two important weaknesses of the traditional overrun brake-system: descending long slopes and reversing. **ITBS** automatically blocks the caravan brakes in case braking is not required.

Descending long slopes

While descending long slopes a car should not use its brakes, but should use the engine to keep speed under control. The use of an adequate, low gear is essential in order to avoid overheated brakes. However the maximum engine speed should not be exceeded.

This is especially important in case of towing a caravan. In the descend the caravan pushes against the trailer hitch. Without **ITBS** the overrun brake would be pushed in and the caravan-brakes would be activated.

With **ITBS** installed, the caravan-brakes are activated only when the towing car is braking too. Consequently the caravan-brakes operate in-sync with the brakes of the towing car. The caravan-brakes get as much time as the brakes of the car to cool down.

Thus the brakes of the trailer/caravan do heat-up much less than without **ITBS** and the risk for glazed linings with **ITBS** installed is much lower.

This is an important safety item indeed as overheated brakes or even overheated bearings may fail unexpectedly and may induce dangerous situations or accidents.

Reversing

Reversing a caravan is widely experienced as difficult because the overrun brakes may block. Damage to the caravan-brakes or the clutch of the towing car could occur.

ITBS avoids the overrun-brake to be pushed-in thus avoiding the caravan-brakes to be activated. Reversing the caravan becomes a smooth operation without jerking.

Remote Control Plug and feed-back

The Remote Control Plug in the towing car communicates wireless with the **ITBS** module in the caravan. The status of **ITBS** is indicated on the Remote Control Plug with LED-colors.

A button on the Remote Control Plug enables **ITBS** to be switched on and off from the towing car.

Intrinsic safety

The system is intrinsically safe because **ITBS** doesnot affect the construction of the original overrun brake system. In case **ITBS** is switched off (or otherwise out of operation) the original functions of the overrun-brakes are maintained. The original overrun brake system remains fully operational.

E.g in case the power-cable between the car and the caravan is disconnected, **ITBS** automatically is switched off and the mechanical overrun brakes remain fully operational.

The handbrake and the safety-cable remain fully operational too, even with **ITBS** switched on!

With **ITBS** installed it is always possible to drive safely with the trailer or caravan, even when **ITBS** is switched of or out of operation.

The behaviour and actions of the control-system of **ITBS** are continuously monitored and registered in a log. The log may be read by the supplier and the data may be used for failure-analysis and software enhancements.

This product has been developed by

**Trailer Safety
Engineers b.v.**

www.trailersafetyengineers.nl