

The Street Barrier Security Handbook



- Mobile street barrier



- Speed Stop



- Frankfurt type street barrier



- Bollard system

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1. Forewords

The international general security situation is today at its peak point. The type of security patterns refer to many operational areas like; auditing – computers – terror attacks – passenger controls – enterprise security – port & airport security – automobiles – etc. Investments into the security sector are at the highest point ever and daily new security systems are introduced to the market place.

Cavotec Fladung has specialised itself within the niche; street barrier entry systems. Some of the installed systems are in operations since the -70th within airports, nuclear power stations, house of parliaments etc.

In general street barrier systems installed world wide are of poor design and crash load capability. The latter means that a car or lorry type of vehicle can pass through the check point and reach its objective.

We have recently had the experience that a local authority selected the cheapest possible street barrier system for a very important installation (tender procedure). Result, the people involved had little experience in this field and the basic function of the system will not be there. Why then install a security system? We believe the producer should be 100% involved in the dialogue with the end user and can discuss details and eventual technical changes for the final delivery.

Street barrier systems should have the ability to be mobile and used in temporary security situations. Such system must be easy to handle and made up of few components and should not need a fixed electrical power supply. Enclosed in this handbook Cavotec Fladung presents such a system.

2. Street Barrier Concept

There are two fundamental technical requirements that a street barrier system must be able to provide:

1. Sustain a high crash impact by a vehicle, up to 100tons per barrier beam
2. Elevation time of the street barrier should be short, 1 to 10 seconds

Providing the two above data provides the security levels which must be met. A car or a lorry should not have the possibility to pass through the security installation at all. At impact the lower structure of the car and lorry should sustain heavy damages so that it cannot proceed. The enclosed video provides some very good practical test demonstrations.

The street security barrier system can be designed in many ways:

1. a single entry / exit barrier, heavy or light duty
2. a double entry and exit barrier, heavy or light duty
3. an entry barrier with a back barrier to close in the vehicles and separated road sections for entry and exit in heavy duty
4. temporary use
5. closing of restricted areas for vehicle usage with only entry card permit

The street barrier system must be built up with high quality components and steel types, otherwise the required functions cannot be met.

Cavotec Fladung has produced the street barrier systems since 1970 and over the years the installed systems have proved themselves.

3. Type of Street Barrier System

a. Mobile type

The “Mobile” street barrier system is for temporary security installations, which are to be set up in a short time by the police or other security organisations.

The system consists of:

1. 2 pcs ramp systems with hinges
2. 1 pc “Entry Control” with hydraulic controls
3. 1 pc Hydraulic control station with push button activation. Optional is radio remote control
4. 1 pc power generator

Other technical data:

- Installation time: 30 minutes
- Dimensions: Width: 3500mm, Length: 1600mm , Height: 250 mm + 2 pcs ramps of 3500 x 3000mm
- Total space requirement: 3,5 x 7,6 meters
- Flashing warning light when barrier is in up position
- All parts hot dip galvanized
- Impact capability: 100 metric tons



b. Frankfurt type

This type of street barrier is similar to the mobile street barrier. Difference is that the Frankfurt type is inserted into the road pavement and becomes a fixed installation.

Complete Description of Frankfurt type of street barrier system

The access barrier is equipped with a separate arranged combined hydraulic energy accumulator which is placed together with the electric control unit in a metal housing (or guard house, separate small building) against environmental factors.

This protective housing will be installed at a suitable place above ground level.

The barrier beams of the underground level mounting unit are level with the roadway surface, when not in use, and are equipped with corrugated iron on their broadside. In the closing position the barrier beams are swung up through 90° to be positioned vertical to the roadway in a distance of 750 mm.

The barrier beams are swinging against a fixed stop and will be locked in the reverse direction by means of a hydraulic cylinder. This blocking prevents a budging of the swung up barrier beams also when loaded with an external vertical or horizontal force. The entire underground level mounting unit consists of a steel structure – construction with a hot galvanised finish which is designed and built to withstand the expected stresses.

All moving parts are provided with lubrication devices.

The bearings are manufactured from high tensile bearing metal. The applied shafts are made of stainless steel.

The barrier beams are actuated by a heavy duty hydraulic cylinder.

In case of power breakdown the electric control is ensured by a 24 V battery (emergency power supply).

The hydraulic energy accumulator guarantees in this case to actuate the barrier for several times.

Furthermore there is a hand pump installed for manual actuating of the barrier beams when needed.

Dimensions:

Barrier Part:

> Width	3.000 – 12.000 mm or more when needed
> Depth	250mm
> Length	1600mm

Mounting Unit:

> Width	suitable for the barrier width
> Depth	approximately 800 mm
> Length	approximately 2000 mm

For optical warning in case of activated barrier there are optional flashing lamps together with red traffic lights switched on and warning markings are present.

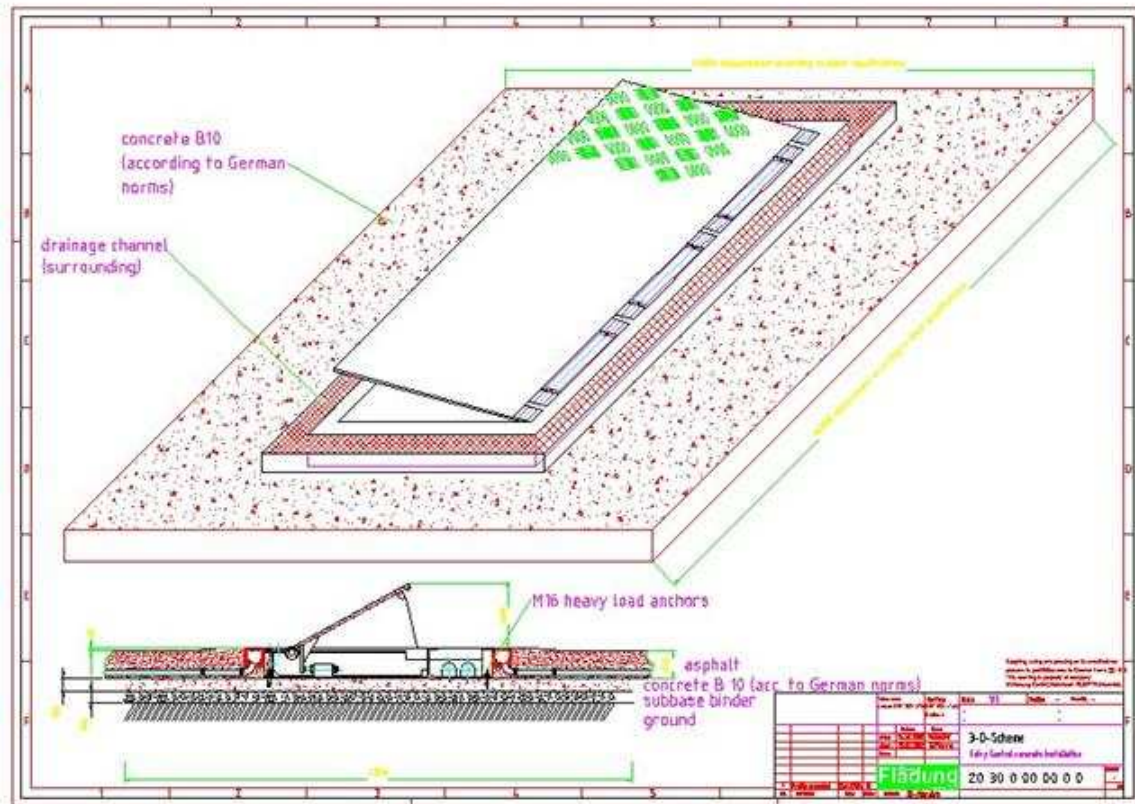
The entire installation of the access barrier is designed and suitable for the operation and tropics.

Other confidential, technical details and options are available upon request.

Advantages of street barrier Frankfurt type

- complete construction and design is TÜV approved and crash tested
- withstands high crash impacts (100 t per barrier beam at 30 km/h)
- double sided functionality
- fast acting mechanism (adjustable from 1 – 10 sec.)
- multi functional even after loss of electrical power (3-4 times)
- barrier system can adapted for each street width (modular concept)
- mounting unit ensures easy and fast installation
- barrier can be driven over, already one day after installation

The following pictures and drawings provide the insight,



c. Speed Stop

The speed stop is equipped with a separately arranged, combination hydraulic-power storage system, housed along with an electrical control system in one single device cabinet.

In the unlocked condition, the barriers of the under floor mounting unit are flush with the road, and are fitted with chequered plates over their breadth (300 mm). These ratchets have a traffic-carrying capacity as per Bridge Class F.

In the stop condition, the barriers swing out to the extent of 90°, in other words, they are perpendicular to the roadway at a distance of 825 mm. The speed stop consists of 4 barriers. In the retracted condition, they prevent thoroughfare.

The barriers swing against a fixed stop, and are blocked in the opposite direction by the cylinder. This locking prevents the barriers from sinking in the swung-out condition even under an external vertical or horizontal load.

The entire under floor mounting unit consists of a hot-dip galvanised steel frame construction and is statically constructed in accordance with the expected load (impact load of 1000KN), in which connection the permissible tensions in the steel are not exceeded.

In order to ensure absolute dimensional accuracy we also supply a concrete pit. This enables short installation times due to pre-manufacture-concept.

All rotating parts have been supplied with a permanent lubricant dispenser. The bearings are made of high quality bearing metal and the shafts are of stainless steel. The barriers are operated by a high performance cylinder with end-of-travel damping.

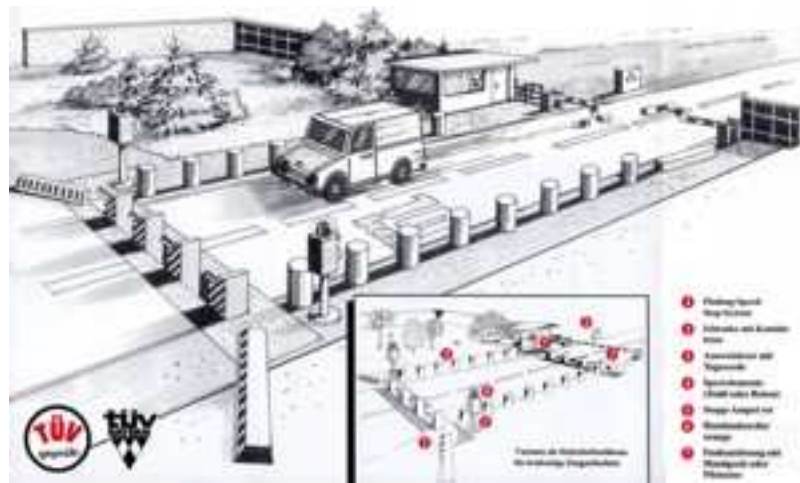
If the pump fails, it is possible to operate the speed stop several times using the pressure accumulator. In emergencies, the speed stop can also be operated with existing hand pumps.

During the main annual inspections, the barriers can be lifted quickly using the lift. It is possible to travel over the same after placing the special traversing bridge supplied along with the equipment.

Dimensions of the barriers (basic unit 4 barriers): Dimensions of the assembly unit:

Width = 3,800 mm
Length = 800 mm
Height = 650 mm above the ground.

Width approximately 4000 mm
Length approximately 1200 mm
Depth approximately 1200 mm



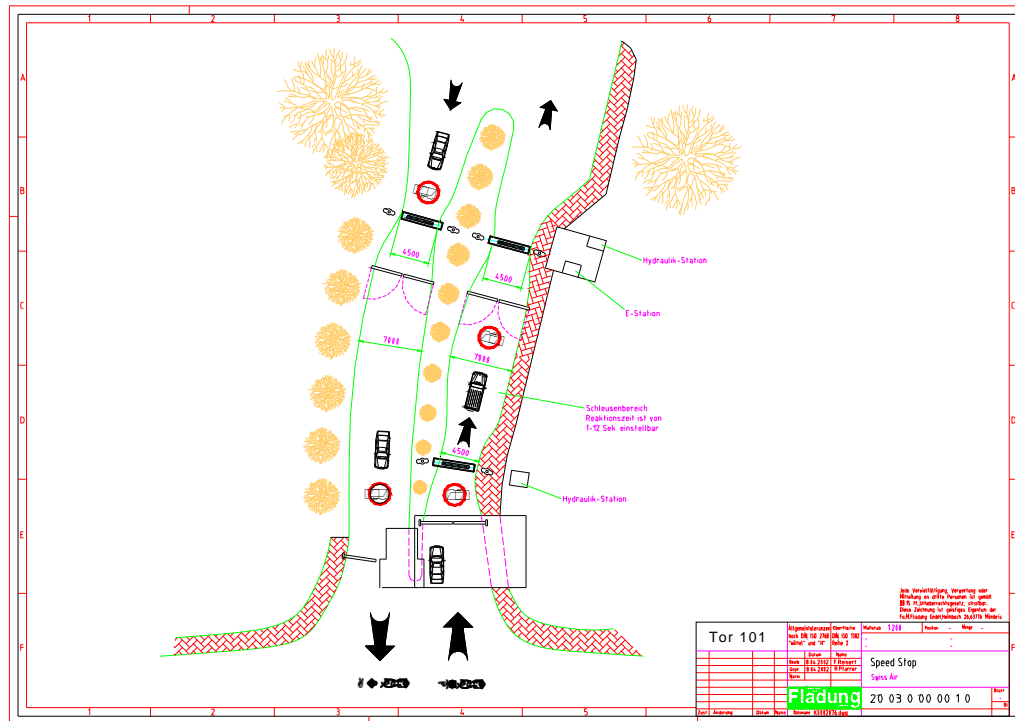
Speed Stop proposal



Speed Stop installation

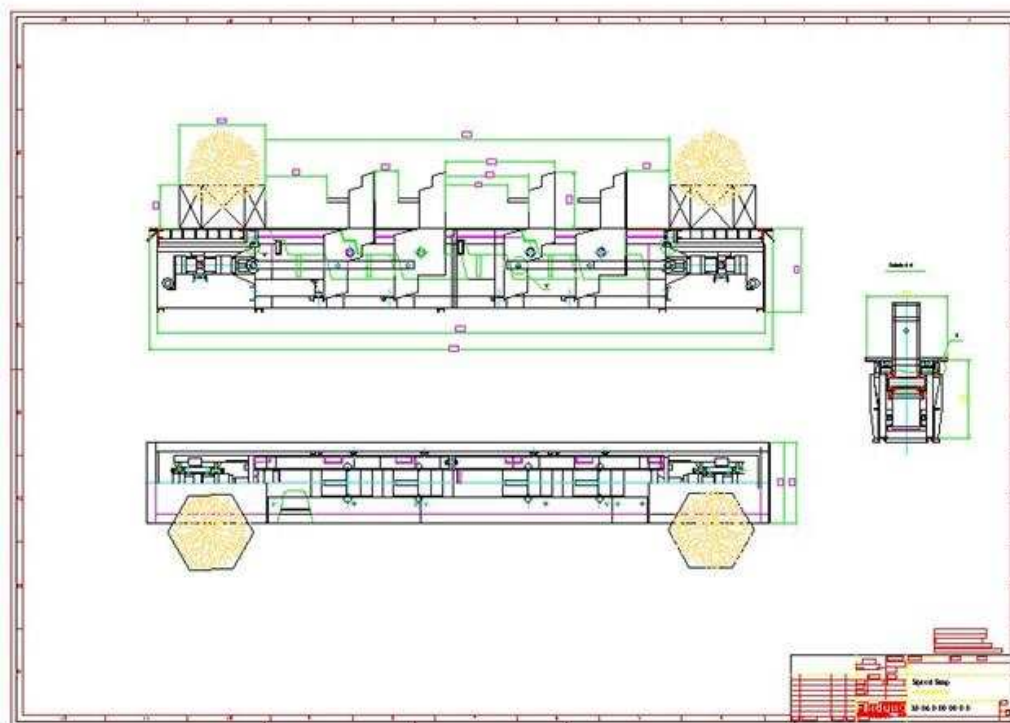
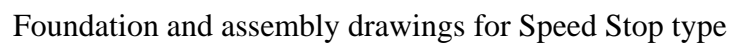


Crash test at Cavotec Fladung



Speed Stop layout, two lanes, IN & OUT and installation picture





d. Bollard system

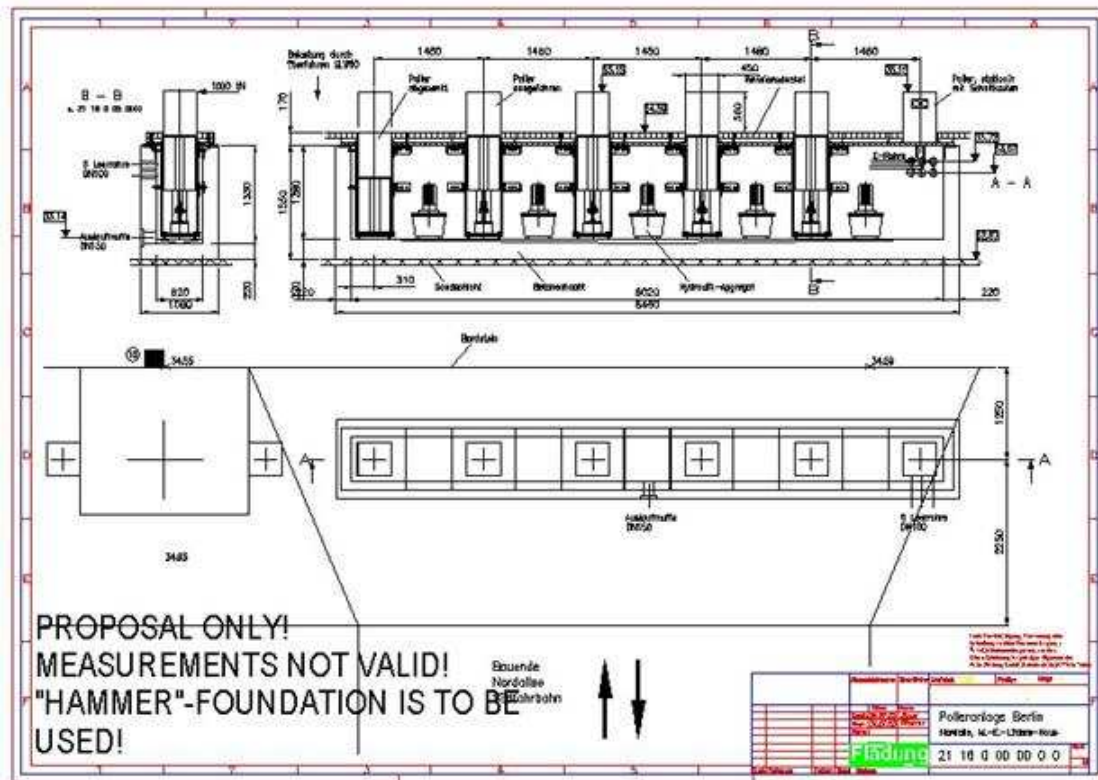
The Bollard speed barrier system and the Speed Stop speed barrier system are very much similar in technical parameters, do need a major civil works, BUT, offers a very heavy duty barrier system, which last over the time and eventual impacts.

In the Bollard type the hydraulic cylinders work vertically and for the Speed Stop type in a cantilever principle. The later minimize the depth of the foundation.

Both systems are designed for high speed impact scenario and the enclosed video will provide the impact evidence during a test at the Cavotec Fladung factory. The Speed Stop installation at the Cavotec Fladung factory is still in use.



Bollard installation at the House of Parliament in Berlin – Germany





The Bollard Speed Barrier installation pictures

4. Maintenance & Service

The Street Barrier systems from Cavotec Fladung are designed in such a way that within the expected lifetime no parts have to be replaced. The installation needs very little maintenance.

Services to be performed to guarantee a safe function:

The street barrier system must be driven out once for testing in a distance of 10 days. The actuation is activated by pushbutton or remote control.

Every 6 months the all lubrication points have to be greased with axle grease as specified. All greasing points as shown on a provided planned maintenance drawing must be greased.

Once a year the entire installation has to be inspected.

Check list and procedures:

- Close the road on both sides of the street barrier
- unscrew joints of lateral cover sheets and remove them
- unscrew foundation screw joints of the street barrier, *make sure that all 8 screws are unscrewed (please also refer to provided sketch)*
- unfasten hydraulic quick couplings
- lift out the unit from the pit with crane or fork lift
- set the optional available cover plates over inside the mounting unit

At the now open street barrier unit the following activities have to be carried out;

Optical check:

- corrosion damages
- deformations

Mechanical check:

- check all screw joints and tighten them with a torque wrench if required

The pit itself must be checked for free drip water drainage and /or the pump sump must be cleaned and the function of the pump tested.

The hydraulic tank has to be completed with hydraulic oil if necessary.

The whole hydraulic oil must be changed after three years.

After all these checks the street barrier system must be remounted

The activities described before ensure a safe function during the service interval of one year.

A pressure loss in the hydraulic system will be indicated to the guard either optical or by acoustic alarm.

Improper or non-authorised maintenance or commissioning causes the expiry of the guarantee

5. List of References

All types of street barrier systems

Note: This info is strictly confidential and may not be disclosed to any third party

- KWU - Neckarwestheim (nuclear power plant)
- WAK - Karlsruhe (reprocessing plant)
- KKW - Biblis (nuclear power plant)
- Zurich Airport
- Frankfurt Airport
- Ministry of Post (Bonn)
- Ministry of Traffic (Bonn)
- Deutscher Reichstag (Berlin)
- Marie-Elisabeth-Lüders-Haus (Berlin)
- Bundesgrenzschutz