

General Information



Features & Effects

DELTA BLOC[®] **Vehicle Restraint Systems**



The flexible concrete safety barrier

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General Remarks

DELTA BLOC® is a modern vehicle restraint system consisting of prefabricated concrete elements and contributes to a remarkable minimisation of accident consequences on roads. It combines optimal safety with highest economic efficiency.



Example of use - DELTA BLOC®

Functions of a restraint system

- ▶ Protection of vehicles from breaking through the vehicle restraint system in case of impact
- ▶ Protection of occupants by minimisation of impacting forces
- ▶ Protection of third parties from caroming vehicles after crashes

Demands

The great variety of demands on restraint systems contains the following points:

- ▶ Short construction periods minimize the influence on traffic flow
- ▶ Resistance to small and medium impacts
- ▶ Simple exchange of damaged elements after serious accidents
- ▶ Very low maintenance costs

The unique product range offers various systems with a precisely defined focus. In addition to highest possible safety there is also given a beneficial proportion between investment- and maintenance costs.

Categories

DELTA BLOC® systems are basically divided into the following categories:

- ▶ Temporary safety barriers
- ▶ Permanent safety barriers
- ▶ Safety barriers for bridges
- ▶ Integrated noise barrier systems
- ▶ Tested system transitions

DELTA BLOC® - the flexible concrete safety barrier

The DELTA BLOC® system succeeded in combining the flexibility of steel systems with the stability of in-situ concrete systems as in uniting the advantages of those – ultimate protection from breaking through and well passenger covering at the same time.

Product features

The essential product features are:

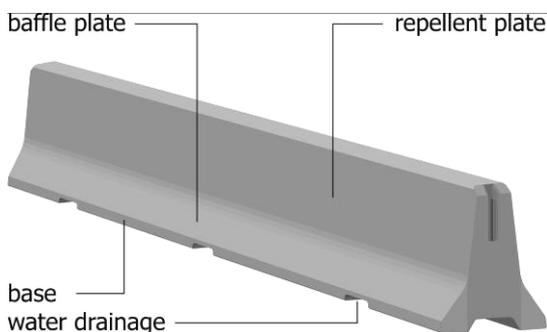
- ▶ the continuous tension bar
- ▶ the patented coupling
- ▶ free installation without connection to the subgrade
- ▶ modular concept enables a change between the systems without interception.

Profile

New Jersey Profile

Most of the DELTA BLOC® systems are based on the "New Jersey Profile". It was developed near New Jersey, USA, in the late fifties. Since that time the form has been known as the New Jersey Profile and has been used world-wide.

It turned out that due to the New Jersey Profile there is a remarkable lower risk of vehicle overturn.



Baffle plate

The majority of all impacts on restraint systems occur at a plane angle of up to 12°. Due to the baffle plate of the New Jersey Profile the vehicle is directed back onto the carriageway – a direct contact between the vehicle and the concrete element is mostly avoided.

Repellent plate

In case of serious impacts at high speeds and big impact angles, the repellent plate prevents breakthrough of vehicles in combination with the continuous tension bar with greatest possible safety.

Base

The base is necessary for constructive reasons and serves as both a base area and a catchment for diagonal draining.

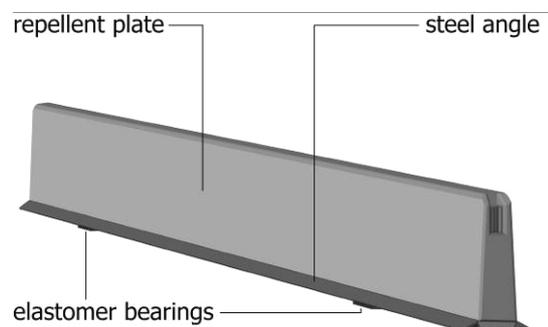
Water drainage

These openings conduce to lateral drainage of surface water and thus enable an arrangement of the rainwater infeeds also behind the vehicle restraint system.

Narrow elements

In areas of road works the crowded amount of space showed the necessity of especially narrow systems, that, nevertheless, guarantee high protection of all road users.

The DELTA BLOC® systems DB 50S and DB65S were highly-developed according to these requirements.



Constituent parts

The narrow elements are made up of a concrete wall, as well as two galvanized steel angles, which guarantee the required dynamic stability and protection from tilting.

Elastomer-stands

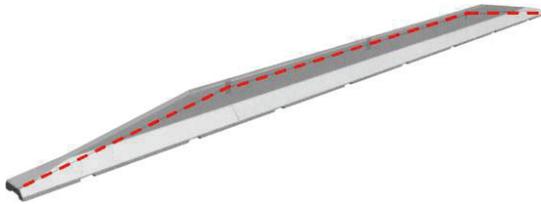
4 elastomer-stands serve as bearings. They assure a safe stability of the elements on the one hand, and there again ensure a separation distance to the lateral drainage between steel angles and carriageway.

Vehicle contact

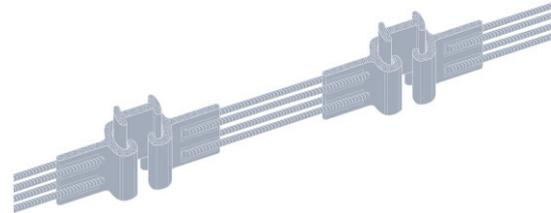
The steel angles are drivable, without hazard, neither for the vehicle, nor the element. A redirection of the vehicles occurs by the repellent plate.

The Continuous Tension Bar

The patented tension bar goes through each DELTA BLOC® element. Depending on the containment level it is used in various strengths.



Course of the tension bar



patented DELTA BLOC® tension Bar

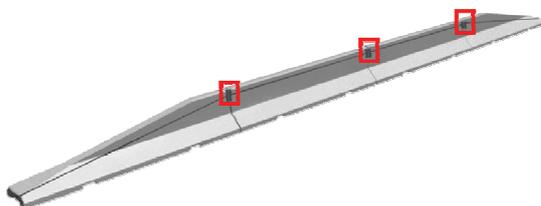
The patented DELTA BLOC® Coupling

The single elements are tied together with the patented couplings and form a chain.



Patented DELTA BLOC® coupling

It comes to a continuous steel tension bar with high tension capacity.



DELTA BLOC® chain link

The energy is distributed among many elements in case of impact. Thus it is more effectively taken up - a breakthrough is reliably prevented.



Chain of elements after an impact of a 38t – articulated lorry

Tested Safety

The testing methods are precisely defined in the EN 1317 in order to be able to compare restraint systems of both various types of construction and those of various materials. After positive testing, each product can be described with few code numbers. These basically consist of:

- ▶ the containment level (e.g. H4b)
- ▶ the working width (e.g. W6)
- ▶ the Impact Severity Level ASI (e.g. ASI B)

These three values enable to distinguish between steel guardrails, local- and prefabricated concrete safety barriers independently of their style of construction. Thus it is easier to estimate their reaction in case of impact.

After more than 100 positive crash tests and after having been present on European roads for decades, the following essential qualities of the DELTA BLOC® product range turned out:

High safety for car occupants

DELTA BLOC® is a flexible traffic safety system. As a rule the elements are loosely set up on the subsoil and are connected to each other with the patented coupling. Thus the complete safety barrier is considerably restricted to displacement. In case of impact it comes to a reduction of energy due to vehicle's stepping back. This leads to a lower risk of injury and consequently to a higher safety for occupants of the crashed car.



Tested occupant safety

Reliable breakthrough protection

Even in case of bad impacts the DELTA BLOC® system offers the highest possible protection against breakthrough of a vehicle.



turn around of a 38t – articulated lorry

Small displacement of elements

The displacement of elements is clearly smaller than that of steel systems of the same containment level.



small displacement of the safety barrier even in case of extreme impacts

Applications - Temporary Safety Barriers



Temporary safety systems are mostly used at construction sites. Furthermore they are used in cases, where only systems of small system widths are applicable.

Systems

- ▶ DB 50S
- ▶ DB 65S
- ▶ DB 80



Temporary restraint system DB 65S

Setting-up option

- ▶ One-rowed with DB 50S, DB 65S 
- ▶ One-rowed with DB 80 

Essential features

- ▶ Very fast mounting
- ▶ Small system widths
- ▶ Fast movement of the elements during construction time
- ▶ Extremely minor strain on occupants in case of an impact
- ▶ Reuse at other construction sites
- ▶ No damaging in case of small impacts – fast exchange of elements after serious impacts
- ▶ Immediate availability from a big rental pool

Applications - Permanent Safety Barriers



Permanent restraint systems are mostly used on motorways and on dual carriageways.

Systems

- ▶ DB 80
- ▶ DB 80F
- ▶ DB 80AS
- ▶ DB 80AS-E
- ▶ DB 80AS-F
- ▶ DB 80E
- ▶ DB 100
- ▶ DB 100S
- ▶ DB 120S



Central reservation safety with DB 100

Setting-up options

- ▶ One-rowed 
- ▶ Two-rowed without backfilling 
- ▶ Two-rowed with backfilling (trough) 

Essential features

- ▶ Reliable breakthrough protection
- ▶ Minor strain on vehicle occupants
- ▶ No damaging in case of small and medium impacts
- ▶ Fast exchange of elements after serious impacts

Applications - Safety Barriers for Bridges



Restraint systems for bridges are also part of permanent restraint systems.

Systems

- ▶ DB 80AS-R
- ▶ DB 100AS-R



DB 100AS-R and DB 80AS-R, Siegtalbridge, Germany

Setting-up option

- ▶ single-rowed on the bridge edge



Essential features

- ▶ reliable breakthrough protection
- ▶ prevention of falling parts also in case of extreme impacts
- ▶ a force-fit interconnection of the elements with the bridge girder is not necessary. Compared to other systems, the load in the bridge construction is reduced by 2/3.
- ▶ fully developed solutions for bridge dilatation joints (Dilatation elements for movements up to 90cm)
- ▶

Applications - Integrated Noise Barrier Systems

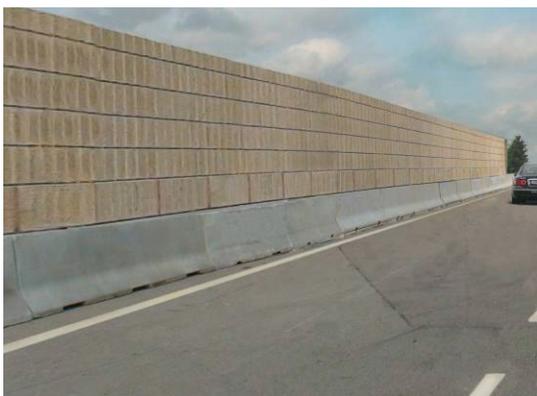


Integrated noise barrier systems of DELTA BLOC® may be applied as well for temporary as for permanent use.

Depending on the model the restraint- and noise barrier system is either used to secure the central reserve or the verge. The noise reduction is achieved with the used absorption material.

Systems

- ▶ DB 80 LSW 300-R
- ▶ DB 100 LSW 400-M



DB 100 LSW 400-M

Setting-up option

- ▶ single-rowed, central reserve
- ▶ single-rowed, verge



Essential features

- ▶ highest containment levels H2, H4b
- ▶ little system width
- ▶ small working width compared to similar systems
- ▶ very efficient combination of vehicle restraint system and noise barrier wall
- ▶ variable height of the wall up to 400cm
- ▶ anti glaring function at oncoming traffic

Applications - System Transitions



DELTA BLOC® transition constructions are permanent safeguarding equipment that permits transitions from DELTA BLOC® elements to EDSP and SuperRail® steel systems as well as in situ concrete systems with 90 cm step profile.

All DELTA BLOC® system transitions are tested according to prEN 1317-4

Types

- ▶ DB SafeLink EDSP
- ▶ DB SafeLink SuperRail
- ▶ DB SafeLink Ortbeton 90 Step

Relevant characteristics

- ▶ high containment level H2
- ▶ low system widths
- ▶ low working width W3 and W4
- ▶ transition to EDSP and SuperRail® steel guard rail systems
- ▶ transition to 90 Step in situ concrete system

Fabrication with Quality

The uppermost objective of the development of our products is the increase of safety on roads. A further goal is to achieve the aim mentioned above by acting economically and by using high-quality products.

The DELTA BLOC[®] elements are produced in factories for prefabricated concretes and are dispatched to construction sites in prefabricated condition. This production method features essential advantages in contrast to the former local concrete construction method.

On the one hand the supervision, the control and the quality assurance of the elements are simpler and more thorough. On the other hand the conditions of production remain the same all-year. Thus the negative influence of the weather and the temperature on the fresh concrete is avoided.

Production

Prime quality concretes are basically used in order to fulfil certain demands such as high strength, frost resistance and short curing periods.

After production, the elements are stored temporarily on the works premises - the concrete carries on hardening and reaches its final strength.



Storing of DELTA BLOC[®] elements

Further processing

Depending on the desired embodiment, attached parts such as reflectors, road sign fixtures, fences etc. can be affixed.



Fence elements



DELTA BLOC[®] reflectors

DELTA BLOC[®] element

DELTA BLOC[®] elements are ready for mounting after complete curing and detailed quality control.

Fast Installation - Short Construction Periods

Regardless of the DELTA BLOC® system, the mounting of each DELTA BLOC® element works basically the same and is roughly divided into following steps:

Base area

The base area must be even and firm. Normally the elements are freely installed on the carriageway. There is no need for anchoring with the subsoil.

Delivery of elements to construction sites

Articulated lorries deliver elements to construction sites. Depending on the system, by up to 20 elements can be delivered per lorry.



Delivery of elements

Displacement

Depending on the mounting team and available space, the DELTA BLOC® elements are displaced either with a crane or with a fork lift.



Installation with a crane and a concrete safety barrier tong



Installation with a fork lift and a concrete safety barrier tong



Installation with a crane and ropes

Insertion of the coupling

In order to connect DELTA BLOC® elements to one solid element chain, hot dip galvanised steel couplings are used.



Insertion of the coupling at lowering

After installing the couplings the force fit interconnection of the elements is guaranteed - the restraint system is ready for use.

Complete protection

Depending on the system, an installation team is able to install by up to 2300m per working day. Due to fast installation a de-traction of traffic flow can be minimised.



Complete central reserve safety

About us

DELTA BLOC® is a guarantor for safety on roads in most European countries.

DELTA BLOC International GmbH



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Novosibirsk 630015
Russia

www.deltabloc.ru

DELTA BLOC France SAS



5, rue de Castiglione
75001 Paris
Frankreich

www.deltabloc.fr

License Partner Overview

DELTA BLOC® vehicle restraint systems are produced by 5 subsidiaries and 32 international partners in 28 countries.



DELTA BLOC® license partners

Austria



MABA Fertigteilindustrie GmbH
Wöllersdorf, Austria
www.maba.at



Betonwerk Rieder GmbH
Maishofen, Austria
www.rieder.at

Belgium



omnibeton

omnibeton nv
Hasselt, Belgium
www.omnibeton.be

Bosnia and Herzegovina



BINIS BETON d.o.o.
Banja Luka, BIH
internet: www.binisbeton.com

Cyprus



I.P. Concrete Works Ltd.
Nicosia, Cyprus

Czech Republic



MABA Prefa spol. s r.o.
Veselí nad Lužnicí, CZ
www.mabaprefa.cz

Denmark



Dragsholm Beton
Asnæs, Denmark
www.dragsholm-beton.dk

France



DELTA BLOC France SAS
Paris, France
www.deltabloc.fr

Germany



DELTA BLOC Deutschland GmbH
Neumarkts, Deutschland
www.deltabloc.de



Wilhelm Siemsen GmbH u. Co. KG
Schwarzenbek, Germany
www.siemsen.de



HANS ABEL KG Betonwerk
Köthen, Germany
www.abel-beton.de

Great Britain



Marshalls Traffic Management
Elland, Great Britain
www.marshalls.co.uk



DELTA BLOC UK Ltd.
Elland, Great Britain
www.deltabloc.co.uk

Greece



ARMOS PROKAT S.A.
41002 Larisa – Sikoriyo, Greece
www.armosprokat.gr

Hungary



SW Umwelttechnik Magyarország Kft.
Majosháza, Hungary
www.sw-umwelttechnik.hu

Iceland



MEST Ltd.
Reykjavík, Iceland
www.mest.is

Ireland



Banagher Concrete Ltd.
Offaly, Ireland
www.bancrete.com

Israel



WOLFMAN INDUSTRIES LTD.
P.O.B. 10357 Haifa Bay
www.wolfman-ind.co.il

Luxembourg



Chaux de Contern
Contern, Luxembourg
www.chaux-de-contern.lu

Netherlands



DELTA BLOC Nederland B.V.
ST Hengelo, Netherlands
www.deltabloc.nl

Norway



BetoNor AS
FØRDE, Norway
www.betonor.no



BRODRENE OSTBYE AS
Elverum, Norway
www.ostbye.no



Jaerbetong AS
Nærbø, Norway
www.jaerbetong.no

Poland



P.V. PREFABET KLUCZBORK S.A.
Kluczborok, Poland
www.pv-prefabet.com.pl

Portugal



Betafiel – Artefactos de Betão de Penafiel, Lda
Penafiel, Portugal
www.betafiel.pt

Romania



SW Umwelttechnik Romania S.R.L.
Jud. Giurgiu, Romania
www.sw-umwelttechnik.ro

Russia



DELTA BLOC Razvitie (Ltd.)
Novosibirsk, Russia
www.deltabloc.ru



OAO PO Barrikada
St. Petersburg, Russia
www.barrikada.ru

Slovenia



SGP POMGRAD – ABI d.o.o.
SLO-9231 Beltinci
internet: www.sgp-pomgrad.si

South Africa



Highway Safety

Highway Safety Products (Pty) Ltd
Johannesburg, South Africa
www.highwaysafety.co.za

Spain



GLS
Consorcio del Hormigón, S.L.U
Lleida, Spain
www.glsprefabricados.com



Bortubo S.A.
Fortuna, Spain
www.bortubo.com



Geysersmarkt S.L.
Almensilla, Spain
www.geysersmarkt.es

Sweden



Meag Genevad
Köping, Sweden
www.meaggenevad.se

Switzerland



CREABETON MATERIAUX SA
Granges-près-Marnand, CH
www.creabeton-materiaux.ch

Belarus



Dorstroyindustria
Minsk region, Belarus
www.dsi.by

Ukraine



OBERBETON INVEST
Kyiv, Ukraine
www.oberbeton.com.ua

Additional Information

Normative references

- ▶ European Standard EN 1317 Part 1 „Terminology and general criteria for test methods“,
- ▶ European Standard EN 1317 Part 2 „Performance classes, impact test acceptance criteria and test methods for safety“

Documents to apply

- ▶ Product information DB 50SL
- ▶ Product information DB 65S
- ▶ Product information DB 80
- ▶ Product information DB 100S
- ▶ Product information DB 100
- ▶ Product information DB 120S
- ▶ Product information DB 80AS-R
- ▶ Product information DB 100AS-R
- ▶ Product information DB 80 LSW-R
- ▶ Product information DB 100 LSW-M

Internet

- ▶ For detailed information, photos and videos of crash tests please visit www.deltabloc.com



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