

# Panzerbelt Cable Protection System



Manufactured by **Cavotec Specimas**



# Panzerbelt Cable Protection System

## Who we are

Cavotec is a multinational group of companies serving the following industries: mining and tunnelling, ports and maritime, steel and aluminium, energy and offshore, airports, general industry and automation. In the early 1960's our main focus was the design and production of motorised cable reels primarily for manufacturers of tower cranes, harbour cranes and mining equipment. Today, Cavotec is connecting mobile equipment around the world in many diverse applications.

## Where we are

The Cavotec Group consists of 7 manufacturing "Centres of Excellence" located in Canada, France, Germany, Italy, Norway and Sweden and by 5 local manufacturing units located in Australia, China, Germany and the USA. For the distribution of products and providing support to customers Cavotec has 27 sales companies which, together with a network of distributors, serve more than 30 countries in five continents. The ultimate objective is to be perceived as "local everywhere".

## How we work

Our aim is to work closely with our customers in order to build long-term partnerships. To achieve this aim we have created a working environment that attracts the best people, encourages them to stay and brings out their best qualities. By producing totally reliable systems and backing them with efficient service, we strive to create true customer satisfaction.



## Panzerbelt Cable Protection System

Based in Italy, Cavotec Specimas is the Cavotec production centre of motorised cable reels, slipping assemblies and Panzerbelt cable protection systems for use in ports, marine, offshore and tunnelling operations.

One of the early successful developments was the Panzerbelt system illustrated in the following pages. Today, more than 320 installations of the Panzerbelt system are in operation at ports and shipyards around the world, reliably adding years to the life of expensive cables.

# Cavotec Group Organisation

As shown here, the Cavotec Group is organised to support its customers around the world through its manufacturing units and sales companies.

Each Cavotec manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to Group customers.

Each Cavotec sales company, in the 27 countries where they operate, aims at better serving its local market following the Group philosophy "to be local everywhere".

## Manufacturing network

### Centres of Excellence

#### France

##### Cavotec RMS

Spring Driven Reels

#### Germany

##### Cavotec Alfo

Spring Driven Reels

Slipring Columns

##### Cavotec Fladung

Aircraft Support Systems

Security Systems

#### Italy

##### Cavotec Specimas

Motorized Cable Reels

Panzerbelt Cable Protection

Slipring Columns

#### Norway

##### Cavotec Micro-control

Radio Remote Controls

#### Sweden

##### Cavotec Connectors

Electrical Plugs & Sockets

#### New Zealand

##### Cavotec MoorMaster

Automated Mooring Systems

### Local Manufacturing

#### Australia

##### Cavotec Australia

Motorized Cable Reels

#### China

##### Cavotec China

Product Assembly

#### Germany

##### Cavotec Micro-control

Radio Remote Controls

#### Sweden

##### Cavotec Sweden

Product Assembly

#### USA

##### Cavotec USA

Product Assembly

### Group Partners

#### Belgium

##### Gantry

Crane Rail Systems

#### Italy

##### Brevetti Stendalto

Cable Chains

##### Prysmian (Pirelli)

Flexible Cables

##### Tratos Cavi

Flexible Cables

## Sales network

### Cavotec Sales Companies

Cavotec Australia

Cavotec Belgium\*

Cavotec BeNeLux

Cavotec Brazil\*

Cavotec Canada

Cavotec Chile

Cavotec China

Cavotec Denmark

Cavotec Finland

Cavotec France

Cavotec Germany

Cavotec Hong Kong

Cavotec India

Cavotec Italy

Cavotec Korea

Cavotec Latin America

Cavotec Mexico

Cavotec Middle East

Cavotec Norway

Cavotec Russia\*

Cavotec Singapore

Cavotec South Africa

Cavotec Sweden

Cavotec Turkey

Cavotec UK & Ireland

Cavotec USA

\* Branch Office

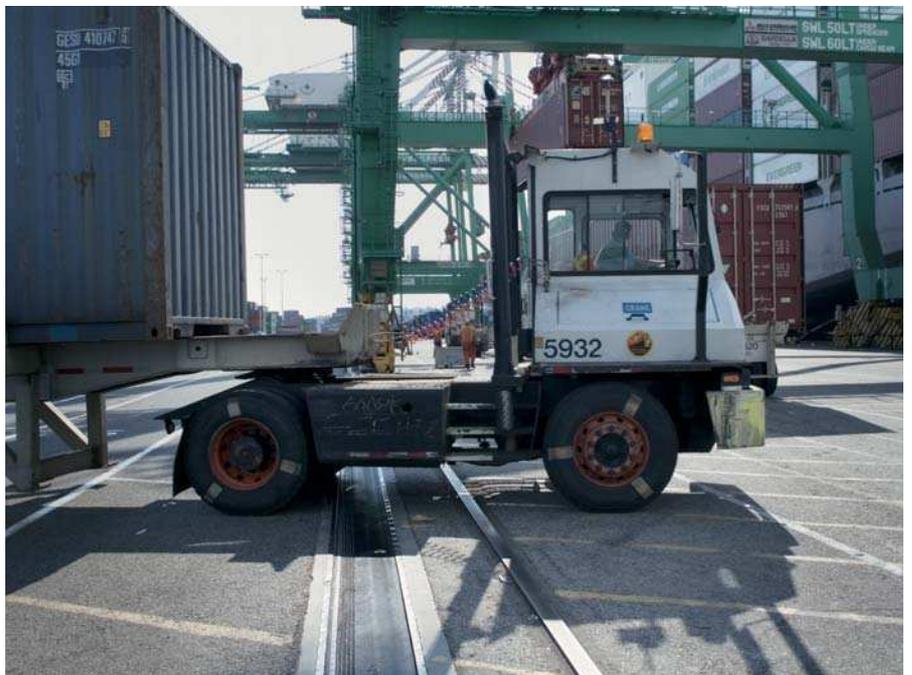
## Panzerbelt - a unique system

"Panzerbelt" is a patented system developed by Cavotec Specimas in the mid-70s, with the aim of providing efficient and economic protection to power cables against damage and problems caused by the increasing cross traffic in ports and terminals.

The more than 318 installations at work around the world today, since the first Panzerbelt was put in operation back in 1976 in the Port of Leghorn, Italy, prove that the system is the right solution. Panzerbelt withstands cross traffic of all vehicles normally used in ports without permanent deformation. It prevents spillage of any nature from entering into the channel and provides the highest degree of cable protection without the need of maintenance.



**Yesterday:** hinged metal plates



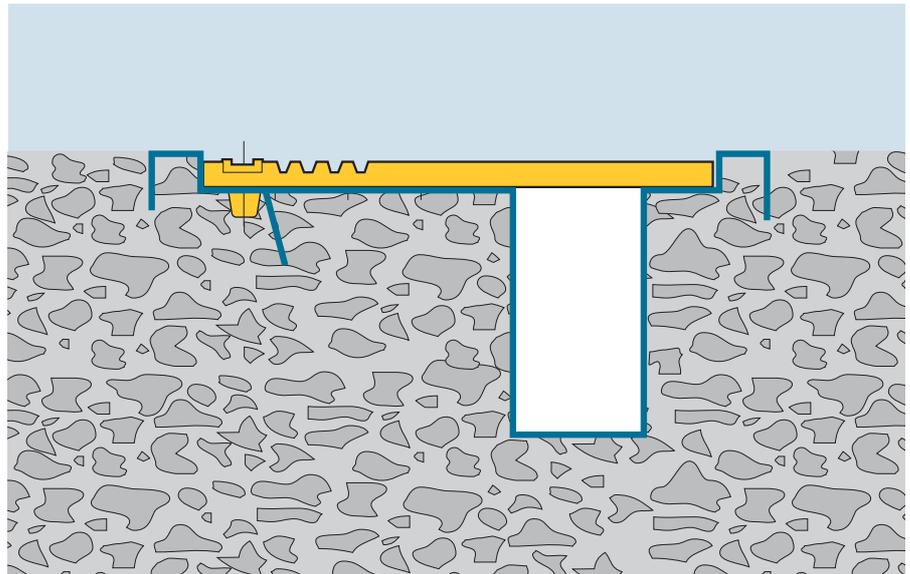
**Today:** Panzerbelt Cable Protection System.

## Guarding against imitations

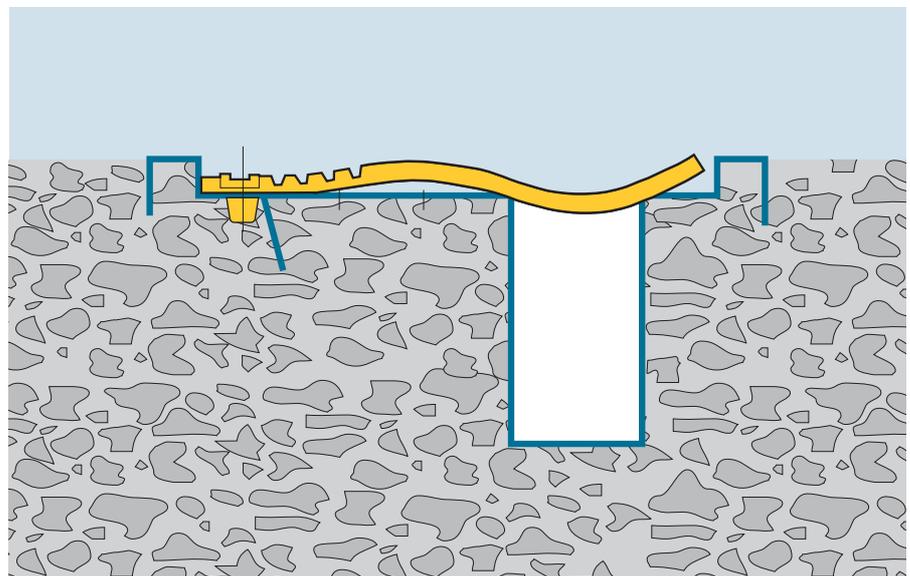
The Panzerbelt System is covered by several patents and registration certificates. Still, as usually happens with any innovative and successful product, imitations have appeared on the market. We can only say that the wealth of technology and experience put in the Panzerbelt System cannot be copied.

Take for example the belt, the most important component of the Panzerbelt cable protection system.

It consists of 13 layers of different materials, including a double layer of steel and textile cord, vulcanized together at very high temperature and pressure. The double layer of steel cord makes the belt rigid in the transversal direction, and flexible in the longitudinal direction. This is of fundamental importance for trouble-free operation of the system.



**Panzerbelt original system**



**Belt imitation**

## A description of the system

Panzerbelt is a cable protection system incorporating a continuous semi-flexible belt, fabricated from rubber with inlaid steel reinforcement, which lies over a channel cast in the quay.

The belt is riveted to the quay surface along one edge, while the other remains free to be raised by a cable guide and belt lifting device fitted to the crane. Steel reinforcement has been incorporated to retain flexibility of the belt in all directions, except transversely to the channel axis, so that the cable inside the channel is totally protected from vehicles crossing the track and from objects falling into the cable duct.

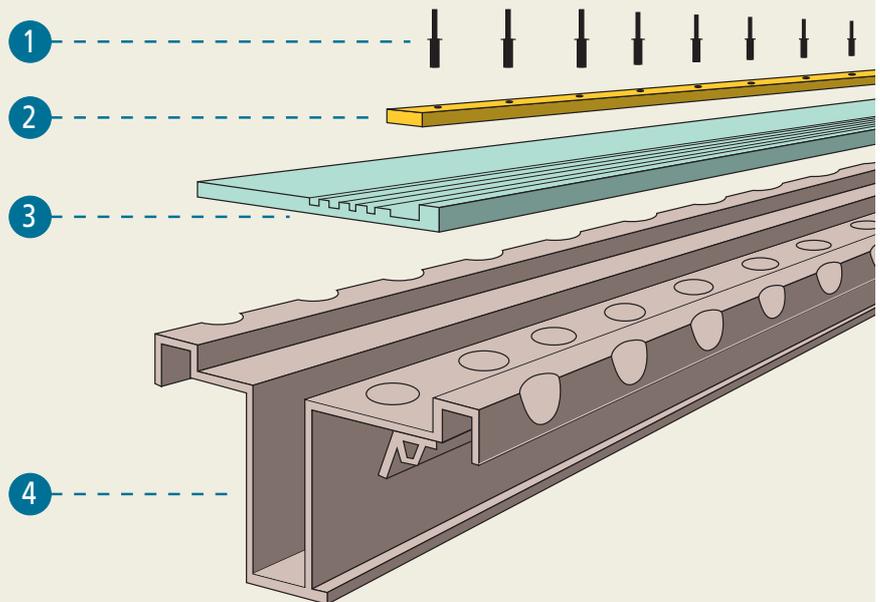
It is possible to convert a hinged plate system both for conductor bars or cable reel supply to this more flexible covering system. As a result of development, trial installations, and practical experience in close cooperation with its customers, Cavotec Specimas can now offer two versions, Standard Panzerbelt and the Super Panzerbelt which offers an extra reinforcement in the fixing area for the heavy vehicles passage.

### The main advantages of Panzerbelt

**Panzerbelt – a continuous flexible covering system for cable channels and conductor bars trenches – gives numerous advantages to the user.**

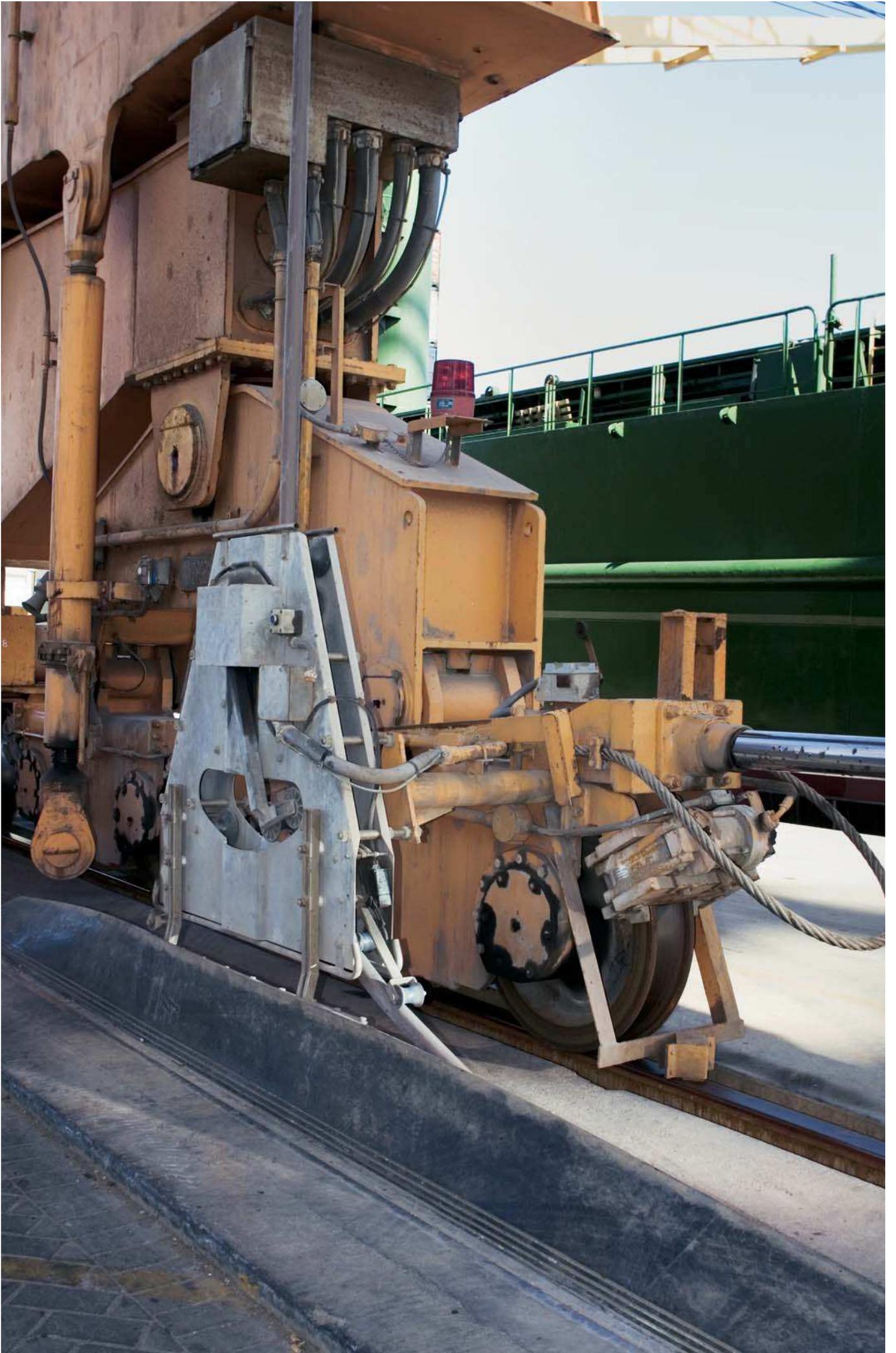
The 10 most important of these are:

- Total operational safety
- Low installation cost
- Full cable protection
- Maintenance free
- No load restrictions
- Channel free from spillage
- Operates in any climate
- No crane speed limitations
- No alignment problems
- Easily adaptable to existing systems



*The main components of the Panzerbelt System:*

1. stainless steel rivets
2. pre-drilled fixing strip
3. Panzerbelt steel reinforced rubber cover
4. steel channel profile

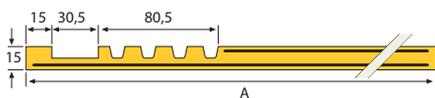


# Technical characteristics

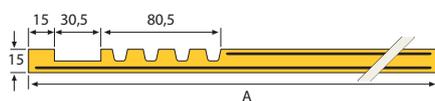
The most significant feature of the Panzerbelt System is the belt. Its manufacture, defined after several years of testing and practical experience, allows it to perform conflicting duties; it must have a high transversal rigidity to support all types of vehicles passing over, but it must also possess sufficient longitudinal flexibility to allow the belt to be lifted into the vertical position.

The belt resists mechanical and abrasive wear thereby minimising maintenance costs. It is weather and corrosion resistant-particularly with regards for normal marine environment conditions.

Type	dimensions A (mm)	Weight (kg/m)
PB 300	295	≈ 6.0
PB 400	395	≈ 7.5
PB 500	495	≈ 9.5
PB 600	595	≈ 11.5



Type	dimensions A (mm)	Weight (kg/m)
SPB 300	295	≈ 6.5
SPB 400	395	≈ 8.0



## General characteristics of the belt

Ambient temperature:	- 30°C up to+ 80°C
Opening angle:	90° max
Estimated lifetime:	> 250.000 cycles (open/close)
Horizontal bending radius:	35m (minimum) with hinge profile external 45m (minimum) with hinge profile internal
Maximum load:	The maximum load applied on a Panzerbelt System with a 100 mm wide slot should not exceed 400 N/cm <sup>2</sup>
Maximum breaking load at joint:	1776 kg for standard Panzerbelt 2669 kg for SuperPanzerbelt
Elongation:	2% with a load of 3000 N
Approx. length of rolls:	50 m
Max force to open the belt at 90°:	40 kg

## Standard Panzerbelt type PB

Materials:	80% SBR-Styrene Butadiene Rubber* 15% Steel cord 5% Nylon
Reinforcing:	Warp: • RFL dipped nylon yarn • Breaking load 50 kN Weft: • Brass coated steel cord-Breaking load 640 kN/m

\* Other types of rubber and reinforcement layers are available for special working environments.

## Super Panzerbelt type SPB (USA and Europe Patent)

Materials:	75% SBR-Styrene Butadiene Rubber 15% Steel cord 10% Nylon
Reinforcing:	Warp: • RFL dipped nylon yarn • Breaking load 50 kN • Two layers specially composed of synthetical fibres • Polyester yarn – Breaking load 20 kN Weft: • Brass coated steel cord-Breaking load 720 kN/m • Polyamide yarn – Breaking load 160 kN

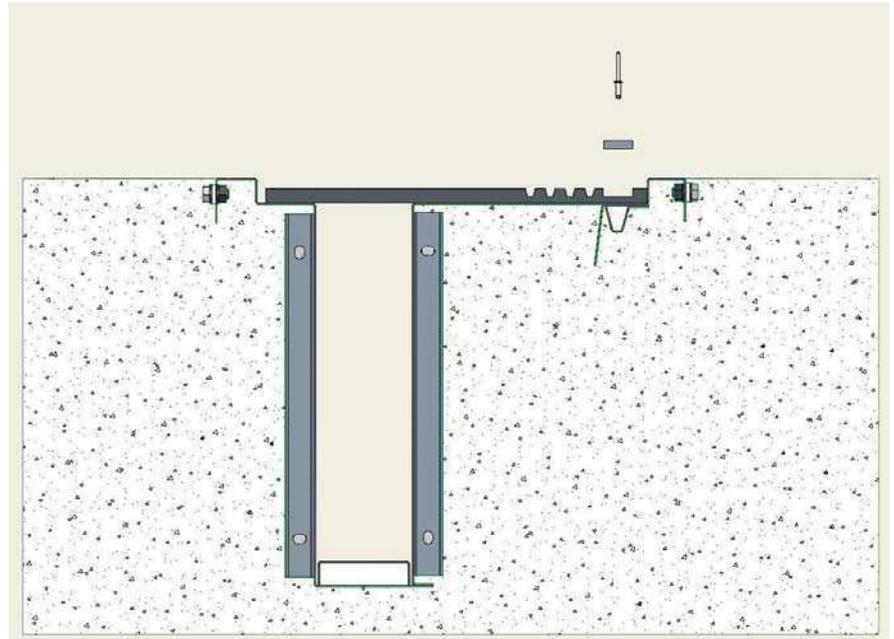
### The standard channel

The Panzerbelt channel, made of stainless steel sheet, according to customer requirements, serves primarily as a framework for the creation of a duct in the quay.

Secondly it is shaped to provide a recess for the belt thus ensuring protection of its edges. It also carries the additional profile that ensures firm fixing of the belt to the concrete. The standard channel comes in two meters lengths with accessories for fast and simple installation on site.

### The belt joint

Belt sections are supplied with galvanized steel joints already fixed at one end. The same rivets - available for fixing the belt - are used to connect the joint to the next belt section.



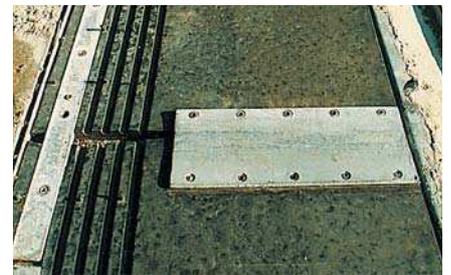
DEPTH (mm)	227,5	327,5	427,5	527,5	627,5
CODES	402	403	404	405	406

Note: Customized channels available on request.

The channel interlock front view.



The channel interlock side view.

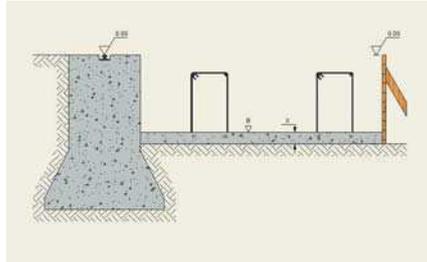


# Simple and fast installation

A complete Panzerbelt System consists of the following components:

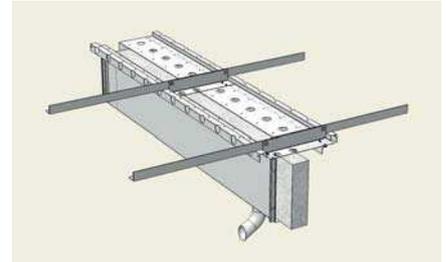
- Either Standard or Super reinforced belt in rolls of approx. 50m, with joints at their ends.
- Stainless steel channel AISI 304 or AISI 316, 1.5mm thick, 2 metre long sections.
- Hot dip galvanised 30x80mm fixing strips, with 13 pre-drilled holes per metre, in 2 metre long sections.
- Stainless steel or nickel copper rivets, 13 per metre.
- Earthing copper strips with screws and nuts.
- Anti-filling and alignment system with expanded polystyrene.
- Alignment brackets for channel sections.

Customized components such as channels, fixing rivets, etc are available on request.



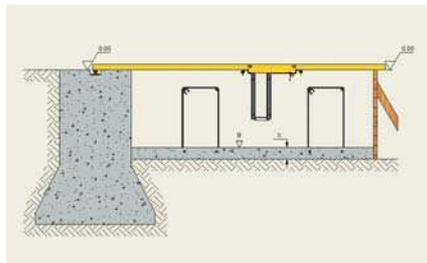
1.

Positioning of a retaining wall and suitable reinforcement. Initial concrete casting fixing the steel reinforcements.



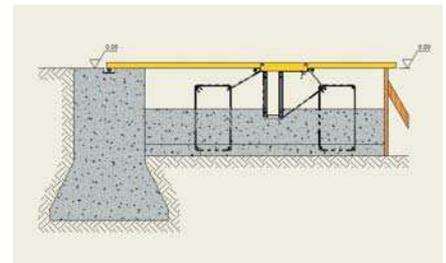
2.

Preparation of a channel section ready for installation. (Cross-members not supplied).



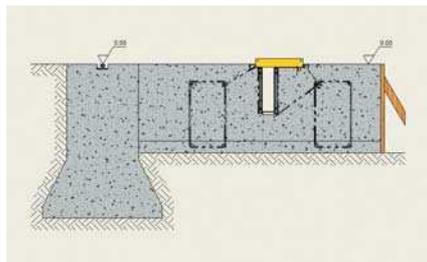
3.

Positioning of the channel section. Adjacent sections are connected using the polystyrene blocks and the end brackets.



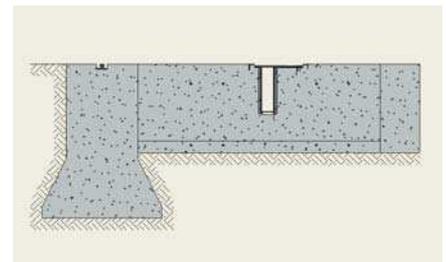
4.

Final alignment and levelling of sections with respect to crane rail. Welding of sections to steel reinforcements.



5.

Final concrete casting. Removal of installation aids, including polystyrene blocks.



6.

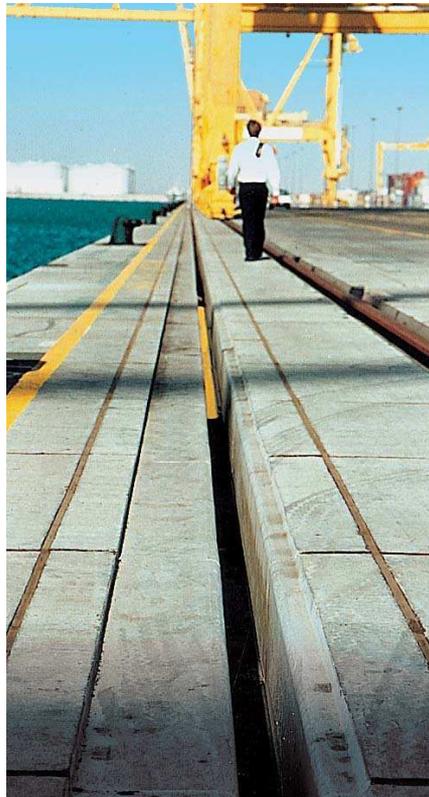
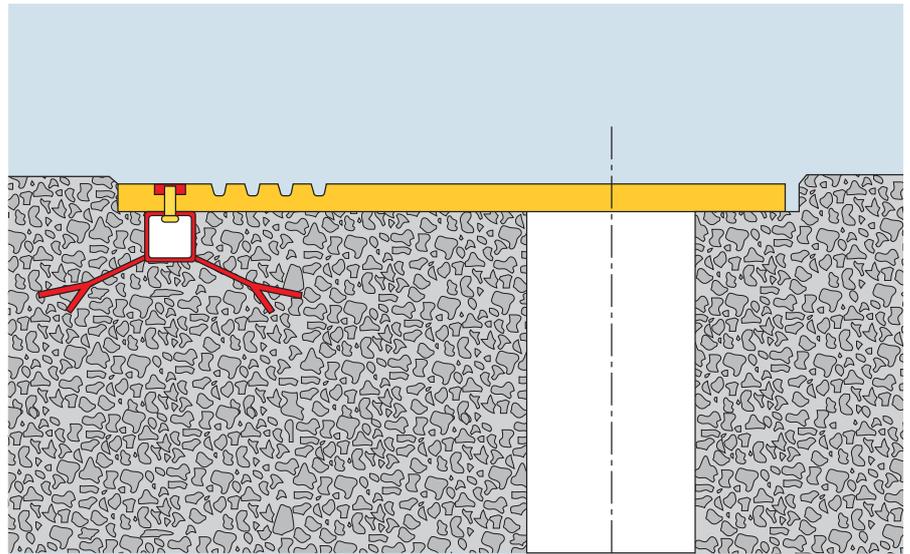
Positioning of belt and fixing through the pre-drilled steel strip using rivets.



## Panzerbelt retrofit

The drawing and pictures show a typical retrofit application where the customer – Jebel Ali Port, Dubai – decided to use the Panzerbelt without its channel in an existing slot.

Our engineering staff is prepared to examine any application and propose alternative solutions utilizing the Panzerbelt System to provide the ultimate solution to any specific requirement.



*Jebel Ali Port - Dubai.  
The pre-existing slot used  
for the Panzerbelt installation.*



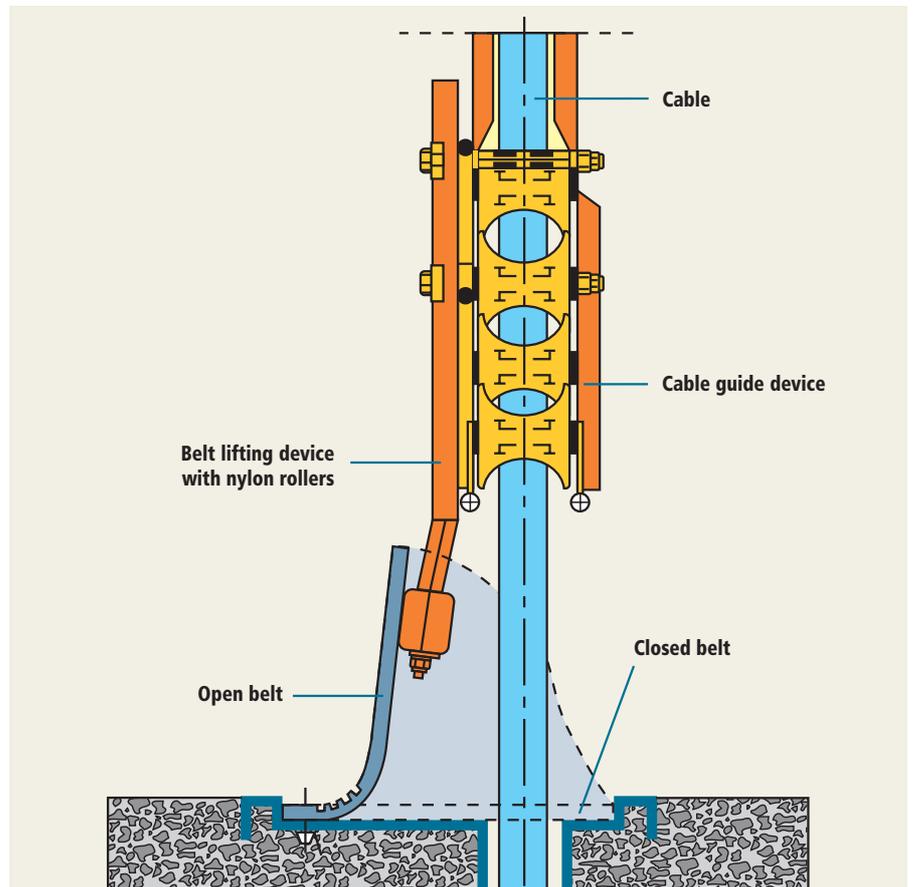
*Jebel Ali Port - Dubai.  
The finished retrofit installation  
1500 m long.*



# Accessories

Every different job requires a customised approach which might need some additional equipment. To meet any specific requirements, the Panzerbelt cable protection system can be supplied with optionals such as:

- 1 Stainless steel turnover anchor (single or double)
- 2 Junction boxes for connecting the fixed cable to the mobile one
- 3 Fixed Panzerbelt opening device
- 4 The belt lifting device. Thanks to the characteristics of the flexible rubber cover, the belt-lifting device has a simple and light construction. The device is made of stainless steel with rollers in nylon charged with molybdenum and is easily adaptable to existing cable guides or pick-up systems.



## Panzerbelt installations around the world



The Panzerbelt system is in use all around the world ensuring that ports are able to function smoothly and efficiently. The number of installations is testament to the quality and reliability of the Panzerbelt system.

Country	N° of installations
Argentina	1
Australia	2
Brazil	3
China	2
Cyprus	1
Costa Rica	2
Denmark	2
Djibouti	2
Egypt	2
England	25
France	15
Germany	19
Greece	6
Holland	4
India	1
Indonesia	5
Israel	2
Italy	84
Ivory Coast	1
Jamaica	7
Japan	8
Lebanon	1
Libya	2

Country	N° of installation
Lithuania	1
Malaysia	23
Malta	1
Martinique	1
Mexico	10
Morocco	1
Norway	7
Oman	2
Philippines	1
Portugal	2
Singapore	21
Slovenia	1
South Africa	5
South Korea	12
Spain	1
Sweden	8
Tanzania	2
Turkey	4
Ukraine	3
United Arab Emirates	12
United Kingdom	29
USA	51
Yemen	1

**TOTAL 396**

Head Office

**Cavotec MSL Holdings Ltd.**

Cavotec MSL is listed on the **NZX**

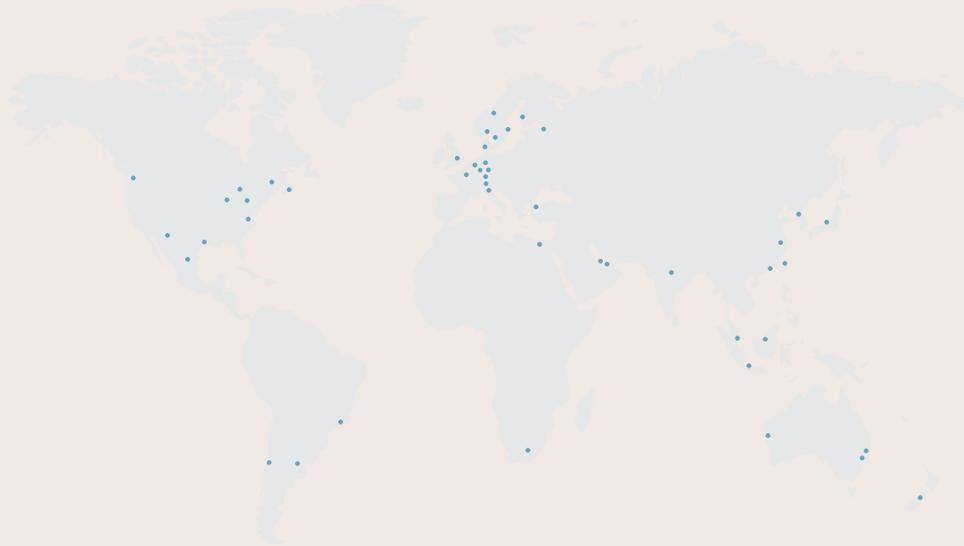
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**Cavotec (Swiss) SA**

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CH-6900 Lugano, Switzerland

*We are present in*

Argentina	Luxemburg
Australia	Malaysia
Belgium	Mexico
Brazil	The Netherlands
Canada	New Zealand
Chile	Norway
China	Russia
Denmark	Saudi Arabia
Egypt	Singapore
Finland	South Africa
France	Sweden
Germany	Switzerland
Hong Kong	Taiwan
India	Turkey
Indonesia	Qatar
Ireland	U.A.E.
Italy	U.K.
Japan	U.S.A.
Korea	



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