









# Gotthard Basistunnel, Switzerland



The "Sedrun Section" of the Gotthard Basistunnel encompasses two tunnels that are each 6,2 kilometres long and supplied through a 800m deep mine shaft. Two tunnels are at the base of the shaft and each breaks through to the north and south in the conventional manner. The project tunnels through the unstable rock of



## Our solution:

Use of the current 80+ Tsurumi wastewater submersible pumps for complete drainage. Pump series used: KTZ, KRS, KTV, LH, KRS with agitator.

## The project:

Railway Tunnel Alptransit Gotthard,  
Sedrun Section

## Executing companies:

ARGE Transco Sedrun  
Batigroup AG Tunnelbau,  
Frutiger AG  
Impresa Pizzarotti & C.S.p.



the Tavetscher Zwischenmassiv with an up to 2.000m overlay. One of the two multifunctional sections of the 57km long Gotthardbasis Tunnel is also being built in the Sedrun section.

## The problem:

Pumping off the abrasive water that collects during the tunnelling excavations.



In the event of abrasive and corrosive utilization, stronger wear and tear will take place naturally in certain components. With regards to the above application wear and tear can take place mainly in impeller, agitator, suction plate, shaft sleeve, oil ring, mechanical seal, pump casing, strainer motor casing and discharge coupling. Depending on the working conditions the lifetime of those parts might vary significantly and can be shorter than the legal warranty period. In this regard, please pay attention to our general conditions of sales ([www.tsurumi-europe.com/english/GCS.htm](http://www.tsurumi-europe.com/english/GCS.htm)) that we also send to you by mail on request.

## Kieswerk Hess AG, Switzerland



### The project:

Pumping off the collecting gravel wash water to the separation system

### Executing companies:

Kieswerk Hess AG, Laupen, Switzerland

### The problem:

The submersible pumps that were previously used transported the gravel wash water to the separation system in a way that interfered with the efficiency of the plant.



### Our solution:

Use of type KRS822 submersible wastewater pumps that are tested for continuous operation and that can be controlled using an intake quantity regulator that is independent of rpms. The result is a more highly efficient plant. The amount of sediment in the basin decreases as a result of the constant movement of water. Pressure and air surges in the pipelines are avoided.

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## Rösrath Treatment Plant, Germany



### The project:

Reconstruction of the sand filter at the Rösrath treatment plant

### Executing company:

Rösrath Treatment Plant  
AggerverbandLS-Anlagentechnik

### The problem:

Pumping of water with high levels of sediment.



### Our solution:

Use of a KRS2-80 with agitator mounted on the classifier (separating plant), which is completely built upon the scraper.

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# ARGE Tunnel Katzenberg, Germany

## The project:

Part of the expansion and new Karlsruhe-Basle section to provide access to the New Transalpine Rail (NEAT).

## Executing companies:

Wayss & Freytag Ingenieurbau AG

E. Züblin Tunnelbau AG

Marti Tunnelbau AG

Jäger Bau GmbH



Two parallel tunnels, each 9.385 metres in length, single-shell segment lining, tunnelling using two Herrenknecht EPB tunnelling machines.



## The problem:

Open water drainage using submersible pumps to the tunnel portals and during tunnelling operations.

## Our solution:

Use of Tsurumi submersible sewage pumps for complete drainage. Pump series used: KTZ, KTV, KRS with agitator.



# ARGE North-South Urban Railway Cologne, Germany



GPN3-80 in slot wall cage

## First problem:

Slot walls up to 45 metres in depth were created. During the building phase the slot walls were filled with bentonite support fluid. In order to cast the slot walls, the ratio of sand in the bentonite must not be greater than 3%. For this reason, the bentonite and sand mixture is pumped to a separating system. There the sand part of the mixture is filtered out, and the regenerated bentonite suspension is reused.

## Our solution:

Use of a GPN3-80 agitator pump mounted in a slot wall cage.

## The project:

Construction of the north-south urban railway, Cologne, south section

## Executing companies:

Bilfinger Berger AG

Wayss & Freytag Ingenieurbau AG

Ed. Züblin AG

The section is about four kilometres long. By far the largest section of the route is underground in two single-track tunnels that run parallel to one another.



Slot wall with pressure lines



Shaft with NKZ3-100H

## Second problem:

Two shafts were drilled near the Old Market (Alter Markt). From here the foundations of the adjacent residential buildings were stabilised. In doing so, various cross drillings are drilled to a depth of up to 50 metres depending on the shaft. Next, the boreholes are injected with a cement suspension. In the case of the boreholes as well as the injections the slurry that collects is diverted out of the shaft using a submersible pump.

## Our solution:

Use of an NKZ3-100H agitator pump.

The NKZ series is especially well-suited for pumping abrasive suspensions.

# Nibelungen Bridge Worms, Germany



## The project:

New building of second Rhine Bridge

## Executing company:

Max Bögl Bauunternehmung GmbH & Co. KG

The new bridge project, built 36 metres away from the old bridge, is a total of 745 metres in length. The section over the Rheinstrom is 322 metres long.



## The problem:

Pumping off the water and concrete mixture created in the course of boring piles that are 900mm in diameter at a depth of up to 50m into the ground for soil stabilization.

## Our solution:

Use of a KTZ411 Tsurumi pump for securing the boring piles during the casting phase. The unit is used to pump out the mixture of water and concrete.

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# NordCeram, Germany



## The project:

Pumping off abrasive ceramic slurry during production.

## Executing company:

Nord Ceram Fliesenproduktions und Vertriebs GmbH & Co. KG, Bremen

## The problem:

Large amounts of water are used to wash adhesive clay residues from the treatment aggregate. The washing water, which carries clay slurry, collects in the ground cavity and has to be pumped back out of the cavity. The problem is that the clay settles, forms sediment and is very difficult to pump. The pumping of abrasive and corrosive fluids subjects the parts to great wear, is prone to failure and is a costly venture. Not all pump technologies are able to handle this.

## Our solution:

Use of type KTV2-37 submersible pumps for pumping off abrasive materials. The pump housing is made completely out of nitrile rubber and has no problem resisting ceramic slurries.

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## Trapp GmbH Cologne, Germany



### The project:

New construction of canal made of site-mixed concrete and liner renovation, Viehtrift, Cologne

### Executing company:

F. C. Trapp Tief- und Straßenbau Köln GmbH

### The problem:

Transferring collecting wastewater during the 14 months of construction.



### Our solution:

Eight type 50C2.75 sewage pumps with cutting mechanism were used. The cutter blades chop up the collecting solid material to prevent clogging. Operational safety was of the utmost importance.

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## Rheinkalk GmbH Wülfrath, Germany



### The project:

Treatment Plant Flandersback, Main water drainage

### Executing company:

Helin GmbH, Hagen

Biergans Pumpen-Vertrieb GmbH, Duisburg

### The problem:

In the course of restoring the industrial plant, mud that was contaminated and had settled in an 8m wide arch shaft had to be disposed of.



### Our solution:

Producing a disposal concept together with Biergans Pumpen Vertrieb GmbH and Helin GmbH. The contaminated mud was pumped and disposed of using submersible pumps through settling basins to the surface in containers.

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# 2nd Strelasund Crossing Stralsund, Germany

## The project:

Construction of the second Strelasund crossing

## Executing companies:

Max Bögl Bauunternehmung GmbH & Co. KG

The Strelasund crossing, which is 4.100 metres long, consists of several bridges and dam structures. These include the 580 metre long cable-stayed bridge that crosses the Ziegelgraben. An enormous, 128 metre tall yet elegant pylon structure makes the cable-stayed bridge a



captivating piece of architecture that is certainly the most prominent structure of the crossing. The Stralsund (645m) and Dänholm (530m) approach viaducts connect on both sides in addition to the structures over the Strelasund (1.070m).



## The problem:

Pumping off the water and concrete mixture created in the course of boring piles that are 900mm in diameter at a depth of up to 50m into the ground for soil stabilization.

## Our solution:

Use of two KTZ411 units for securing the boring piles during the casting phase. These units are used to pump out the mixture of water and concrete.



## TBG Ready-mix Concrete, Germany



### The project:

Recycling basin on a ready-mix concrete mixing facility

### Executing company:

TBG Transportbeton Lüssen, Bremen

### The problem:

The concrete mixer is cleaned with water, which is then diverted to the recycling basin where cement slurry is deposited.

### Our solution:

A type KTZ45.5 submersible pump is used to pump the recycling water containing the cement slurry to the mixing system. The pump has been in continuous operation for three years and shows no signs of wear.

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## ARGE Tunnel Tröingeberg, Sweden

### The project:

Torebro-Heberg Tunnel Tröingeberg, Sweden  
two-lane railway tunnel, tunnel length: 1.160 m

### Executing company:

Per Aarsleff Bygg- och Anläggnings AB  
Beton & Monierbau Gesellschaft.m.b.H

### The problem:

Drainage with the help of submersible pumps in preliminary section and during the tunnel drive.

### Our solution:

Type KTZ32.2 and KTZ45.5 pumps are used.



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# East Butterwick Pumpstation, UK



## The project:

Renovation of a pump station in East Butterwick, North Lincolnshire, Great Britain

## Executing companies:

T-T Pumps Ltd., Cheshire

Messingham Internal Drainage Board

The pump station was built after the Second World War and is used to pump off flood water.

## The problem:

In 1981 our partner, T-T Pumps Ltd., equipped this pump station with two TO500B855 units, each with a 55kW power rating. 900 litres per second is moved at a height of 4,5m. The operating range should additionally be between 0m and 7,5m. Although the pumps have run for twenty-three years without failure or need for spare parts, the Messingham Internal Drainage Board decided in 2004 that the pumps had reached the end of their lifespan.



## The solution:

Again, T-T Pumps Ltd. won the bid. The solution that was offered was simple and inexpensive: In 2005 it was possible to employ two new type TO500B855 pumps of the latest design to be operated for another 24 years – without risks or large-scale reconstruction.

The installation of the pump control developed by T-T Pumps Ltd. has now made it possible for the pump station to be used for draining the surrounding fields during dry periods.

# ARGE Tunnel Grouft, Luxemburg



An approximately three km long tunnel is being built north of the city of Luxemburg. It is part of the new section of the "Route du Nord" and consists of two tunnels from which one three-lane and one two-lane tunnel have a gradient of almost 4,5%. The tunnelling work is being performed using conventional construction methods and explosives. The tunnel connects the Heeschdrëfferbiërg plateau in the south and the Alzettetal near Lorentzweiler in the north. This will create a section connecting to the important north-south track in Luxemburg.



## Our solution:

Producing a drainage concept. Types used: KTZ22.2, KTZ32.2, KTZ45.5, KTZ47.5, LH25.5W

## The project:

ARGE Tunnel Grouft, Lorentzweiler, Luxemburg

## Executing companies:

Wayss & Freytag Ingenieurbau AG,  
Max Bögl Bauunternehmung GmbH & Co. KG  
Societe de Travaux Galere s.a.  
Tralux s.a.r.  
Felix Giorgetti s.a.r.



## The problem:

Open drainage during tunnelling and construction in the open with the help of submersible pumps.



# Storm Flood Gate Maeslantkering, Netherlands



Foto: Rijkswaterstaat

## The project:

Operating the ballast tank of the storm flood gate Maeslantkering

## Executing company:

Distrimex Pompen & Service b.v., Netherlands  
Van der Ende Pompen b.v., Netherlands

The Maeslantkering, a storm flood gate, is located at Hook of Holland (Netherlands). This gate closes off the inland-directed waterways when there is a threat of a storm surge. The gigantic gates are the size of a seven-storey high-rise building.

## The problem:

To close the gates, the ballast tanks are flooded. To open these gates the ballast tanks have to be pumped out again.

The prolonged dry run is particularly demanding for the pumps because the gates are only closed a few times per year.

## The solution:

Thirty KTZ type pumps were installed for this purpose. These KTZ pumps also remove the last remaining silt from the tanks.



Foto: Rijkswaterstaat

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# Mink Farm, Netherlands



## The project:

Pumping out faeces from a mink farm

## Executing company:

Distrimex Pumpen b.v., Netherlands  
Van Mierlo Pompentechniek b.v., Netherlands

## The problem:

The faeces of the animals are gathered in a slurry tank. This tank is emptied from time to time.

## The solution:

A wastewater pump of the type 100B43.7 equipped with canal impeller, duck foot bend and guide rail fitting was installed in the slurry tank of the mink farm.

The B series proved very effective in cattle breeding and is used quite often for keeping pigs and piglets.

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# Latest Technology and Highest Quality

## A - Tsurumi stuffing box - absolutely watertight



The stuffing box is located at the cable entry section and takes the part of sealing of the motor. As the cable conductors consist of twisted wires, water may penetrate into the motor by the capillary phenomenon when cable sheath or insulation is damaged or when the end of the cable is submerged. The construction is such that a certain part of the insulation of each conductor is peeled and filled with rubber or epoxy resin for the complete sealing.

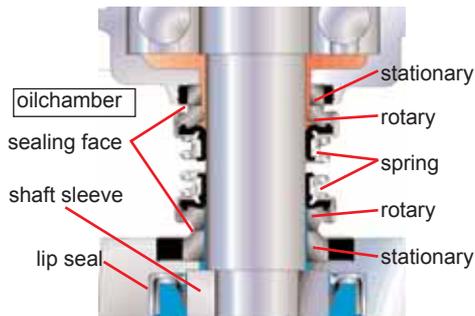
## B - Continuous use under dry run ("on snore")

Located directly above the motor windings, a snap-action self-resetting bi-metal device cuts off voltage from all three phase windings simultaneously if the current is too large in one, two or all three windings, or if the windings get too hot.

Tsurumi enables measurement of winding resistance and insulation from the far end of the cable, without ever removing the cover from the motor in the field.

## C - Double mechanical seal in oil bath

All Tsurumi pumps dispose of a double sealing systems for extended lifetime:



1. A shaft sleeve in connection with a special lip seal protects the mechanical seal from particles - abrasive particles are expelled back into the flow - they don't have contact with the mechanical seal at all !!

2. All Tsurumi contractors' pumps - even the 400W class - have double mechanical seals inside an oil bath. The seal material is Silicon Carbide - no other has greater hardness. Resistance to temperature fluctuation and corrosion is also the best available.

## D - Increased wear resistance of pump casing and impeller

As contractors' pumps are used in unpredictable circumstances, Tsurumi has gone a long way towards making the impeller capable of the impossible and towards providing spare motor power to match.

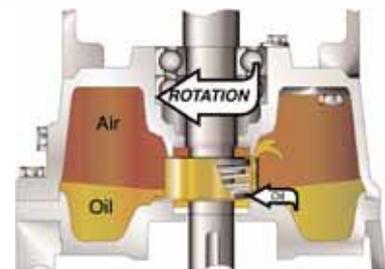
**Tsurumi contractors' pumps are used extensively for bentonite mud, often with earth in the case of the models fitted with an agitator.**

## E - Ball bearings of highest quality

Due to the high quality of the shaft and the bearings all pumps can be run horizontally when entirely submerged.

## Oil Lifter

A special patented guide vane is attached inside the oil chamber. With the motor rotation oil is pumped up. Therefore even at low oil level lubrication and cooling of the mechanical seal is secured.



We reserve the right to change specifications and designs herein for improvement without prior notice. Our pumps are for professional use only. In the event that Tsurumi (Europe) GmbH have, in exceptional cases taken over, a manufacturer's warranty, this entitles the end-user to assert remedy free of charge against Tsurumi (Europe) GmbH due to any defect to the product occurring during the guarantee period (see below), also then when the warranty claims against the seller do not or no longer exist. In the event of malfunction, which is attributable to the improper handling by the enduser, no guarantee claim shall arise. Further claims shall not result from the warranty, unless if something to the contrary has explicitly been determined. The decision as to whether remedy is effected by way of replacement or repair shall be at the choice of Tsurumi (Europe) GmbH. The claims shall be time barred after a period of three months after expiry of the guarantee period, however, not before expiry of the warranty period which is valid towards the seller. In the event of doubt, the warranty period shall correspond with the warranty period which is valid between the end-user and his seller.

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