

More than 50 years of reliable load transfer solutions in Europe



D - 67693 Fischbach near Kaiserslautern

BRENTZEL



I

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- The Function of the Dowels
- Type of joints in Road Construction
- Production Process
- Quality Control
- Sustainability





1954 Foundation of the company "EISEN-BRENTZEL" by Otto Brentzel, as a classic iron steel trade



1959

Extension of the product range

1970

Introduction of Dowels and Tiebars

1972

Start of cooperation with the Technical University Munich

1975

Expansion of production and storage halls in Fischbach





▶ 1987

Handover from Otto Brentzel to Heinz Brentzel

2007/2008

The largest individual orders in the company's history in Azerbaijan and Kazakhstan

2.4 million "Brentzel-Dowels" were delivered!





2021

Dirk Brentzel becomes the owner

► 2025

Currently 31 employees and approx. 10,000 tons steel is processed per year



Our Company today!





Introduction

A joint that is frequently subjected to heavy traffic loads but is not properly doweled tends to develop step formations.

→ This leads to impairments in driving comfort and safety, as well as potential damage to the concrete.





Dowels

Used in transverse joints to transfer loads and ensure that the concrete slabs remain at the same height

Tiebars

Used in longitudinal joints to prevent the slabs from drifting apart



The function of Dowels

- Transmit shear forces
- Stabilize the concrete slab
- Allow for the expansion of the concrete slab
- Enable proper adjustment of crack surfaces during joint opening and closing



Advantages:

ENT7.ET

- Prevent step formations (through shear force transmission)
- Reduce the required thickness of concrete slabs
- Ensure the long-term functionality of joints



Requirements:

- Sufficient dowel diameter to absorb shear forces
- Smallest possible pull-out resistance
- Durable and effective corrosion protection
- Placement must be laid in the middle of the slab pavement so that they do not impede expansion of the slab





This must be avoided!



Types of Joints in Road Construction:

Contraction/Construction joints





Expansion joints



Compression joints



- Transverse compression joint
- Dowels Ø 25 mm, length 500 mm, spacing 25 cm



- Longitudinal compression joints
- Tiebars Ø 20 mm, length 700 mm, spacing 1 m (5 Tiebars per slab)





The function of Tiebars

- Prevent slabs from drifting apart
- Transfer of shear forces
- Concrete slab stabilization









Dowel and Tiebar installation methods

Automated placement using of a paver







Manuel placement using dowel holders





BRENTZEL Standard structure / Dowel and Tiebar distribution





Production Process of the Dowel

- Smooth reinforcing steel is sawn burr-free and without changes in cross-section.
- If the blanks exhibit deformation, the dowel could create a Tiebar effect and cause issues during automated installation with a slipform paver.









It shouldn't look like this

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This is what it should look like!







- Sawed blanks are heated and automatically coated with polyethylene
- The coating thickness must be between 0.2 mm and 0.8 mm
- The polyethylene coating has to be resistant to alkalis





The effects of PE-Coating:

☑ very low pull-out resistance

☑ highly effective corrosion protection





Dowel packaging by a robot



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Dowels packaged for shipping





Standard Dowel Ø 25 mm, Length 500 mm, PE-coated



Dowel holders (wide version) for contraction/construction joints



Dowel holder (narrow version) for use in a expansion joint with joint filler and sleeves for support on both sides.



Dowel holder production





Production process of the Tiebar

- 1. Tiebars made of B500 structural steel, both sides are cut with a reinforcing bar cutter
- 2. The blanks are heated and then automatically coated with polyethylene in the middle (joint) area over a length of approx. 200 mm.



Cutting of the Tiebars



Coating of the Tiebars

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Standard Tiebar Ø 20 mm, length 800 mm, ca. 200 mm of the middle section coated with PE





Bonded Tiebars for longitudinal compression joints





Quality Control

Internal Testing:

- Steel quality testing in cooperation with steel manufacturers (tensile strength)
- Continuous monitoring of the PE coating (e.g., coating thickness measurement)





Test of the PE-Coating during the manufacturing process



Dowel (in the lower section)



Dowel (in the upper section)





Dowel (in the middle section)



Tiebar



Documentation

| Production protocol | | | | | | | | | | Feb 25 | |
|--|------------|-------------|------------|------|------|------|------|------|------|--------|--|
| - 10 Dowels DM 25 mm / Production per day | | | | | , | | | | | | |
| – Me | asuren | nent at the | e upper er | nd | | | | | | | |
| - Coating thickness => min. 0,2 mm - max. 0,8 mm | | | | | | | | | | | |
| | | | | | | | | | | | |
| Tag | Dowel 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | 0,35 | 0,38 | 0,38 | 0,37 | 0,39 | 0,35 | 0,36 | 0,34 | 0,39 | 0,37 | |
| 4 | 0,37 | 0,39 | 0,38 | 0,39 | 0,34 | 0,33 | 0,36 | 0,40 | 0,41 | 0,38 | |
| 5 | 0,35 | 0,34 | 0,37 | 0,35 | 0,38 | 0,35 | 0,37 | 0,34 | 0,39 | 0,38 | |
| 6 | 0,35 | 0,37 | 0,40 | 0,38 | 0,35 | 0,34 | 0,33 | 0,38 | 0,37 | 0,38 | |
| 7 | 0,37 | 0,35 | 0,38 | 0,36 | 0,39 | 0,38 | 0,40 | 0,39 | 0,37 | 0,34 | |
| | | | | | | | | | | | |



External Testing:

- Regular product testing in accordance with EN 13877-3, ZTV and TL Beton regulations
- Ongoing quality monitoring by TU Munich (Institute for Road, Railway and Airfield Constructions)
- Testing of the "pull-out" resistance, coating thickness and corrosion resistance (e.g., salt spray test)



Sustainability

- The steel we use is made from over 95% recycled scrap metal.
- Electricity is generated by our in-house photovoltaic system (total capacity: 365 kWp).
- Any additional electricity required is sourced as certified green energy from the local utility provider.
- Our polyethylene coating is PFAS-free, ensuring environmental safety.









For further information:

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Thank you for your attention!



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