

AC Duopave – The Two-in-One Asphalt Pavement Concept

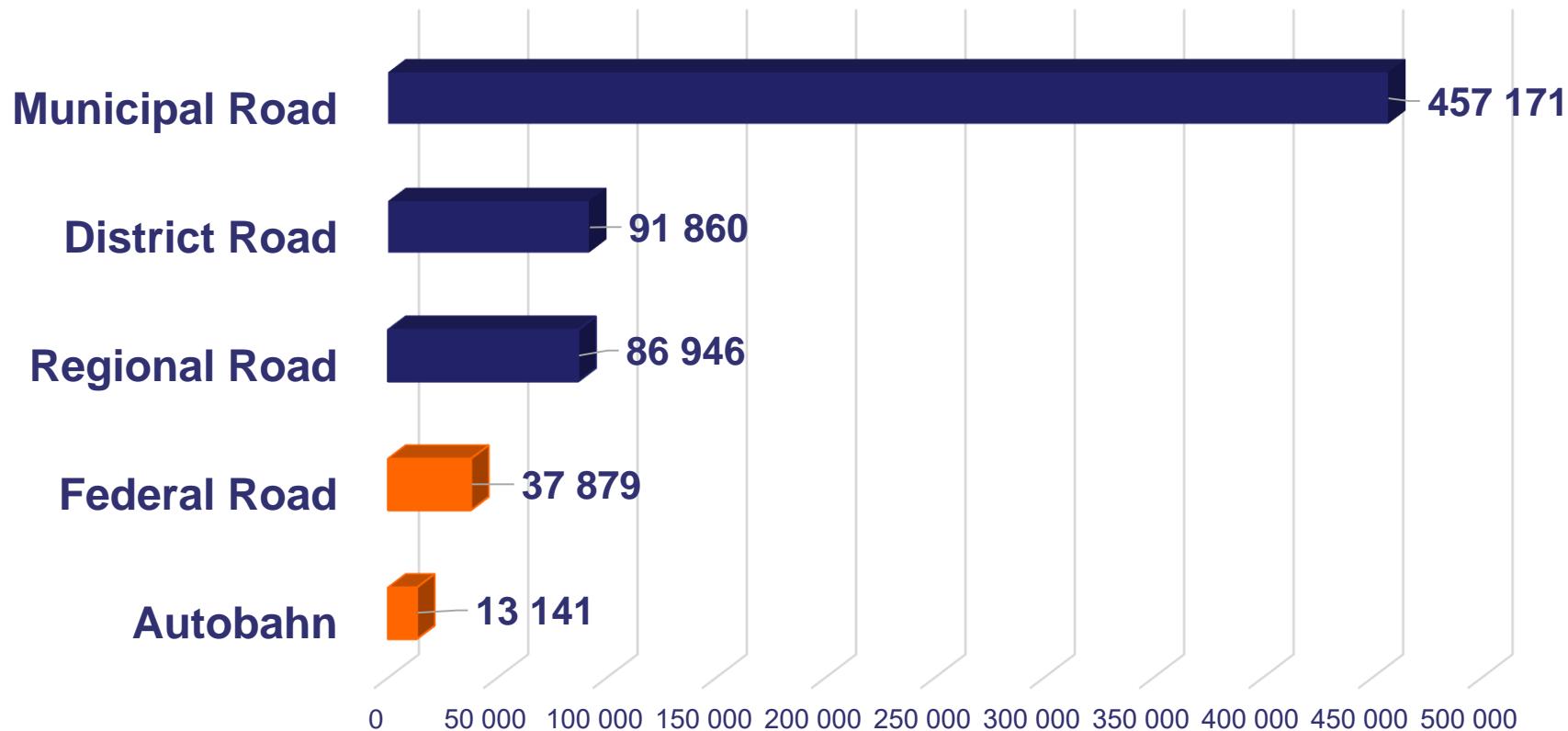
Samir Irzayev

J. Rettenmaier & Söhne GmbH + Co KG, Holzmühle, Germany

28 – 29 November 2023, České Budějovice

Motto: Let's asphalt out of the crisis

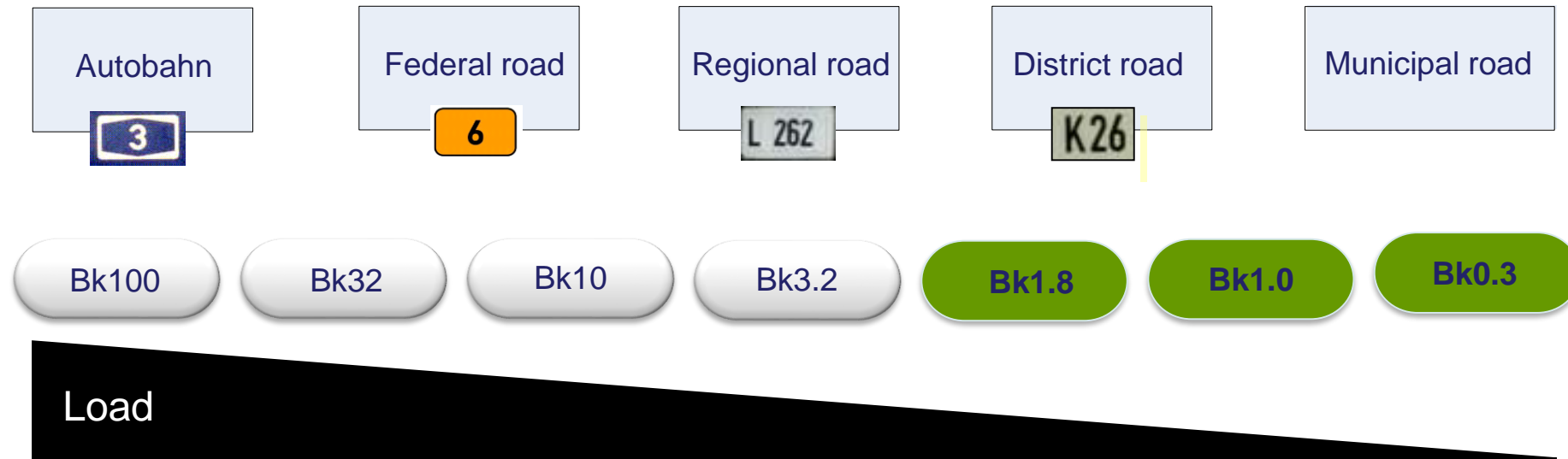
German road network, in km:



Source: Der Elsner 2020

- ➔ Overall German road network: 686 997 km
- ➔ Autobahns and federal roads: only 51 020 km (7.4 %)

German road classification according to loads:



Load class	Bk1.8	Bk1.0	Bk0.3
Surface course	4 cm	4 cm	4 cm
Base course	16 cm	14 cm	10 cm
Total (on frost protection layer)	20 cm	18 cm	14 cm

Basic approach:

Step 1

➔ Milling and / or profiling with asphalt

Step 2

➔ Overlaying with asphalt surface course

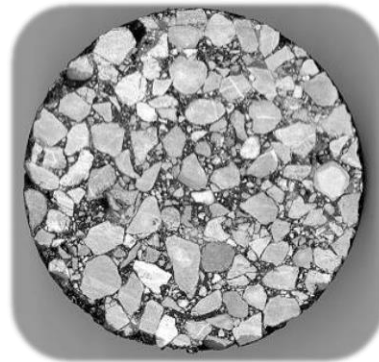


Time and cost INEFFICIENT

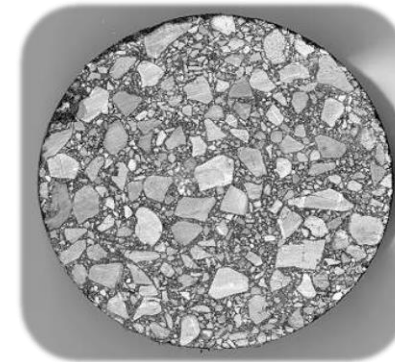
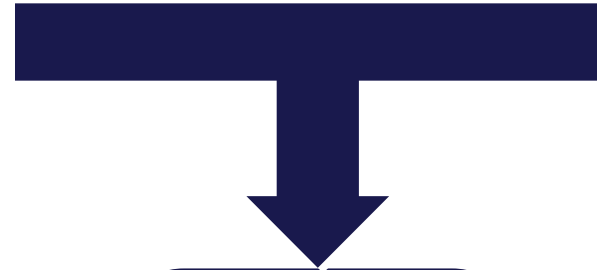
Solution: „AC Duopave“



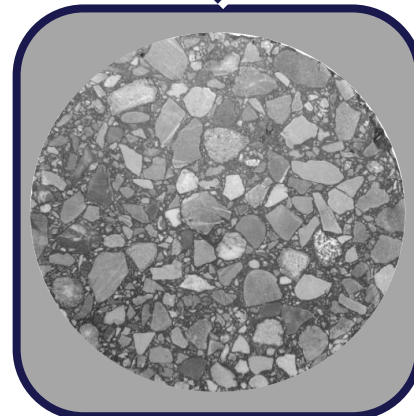
- ➔ Combination layer of surface and base course
- ➔ Two-in-one concept (SMA + AC)



SMA



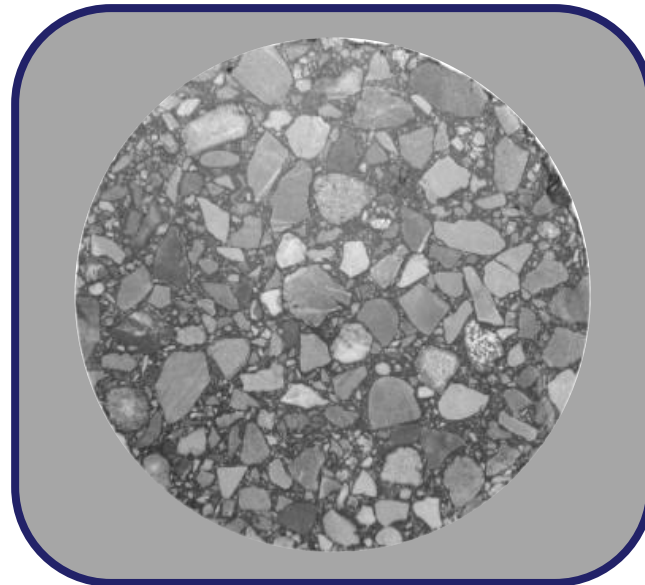
AC



AC Duopave

AC Duopave 16:

- ➔ Large portion of maximum aggregate size
- ➔ Crushed aggregates
- ➔ Standard road construction (straight-run) bitumen
- ➔ Cellulose fibers as stabilizing additive
- ➔ Use of reclaimed asphalt pavement (RAP) possible
- ➔ Waterproof design



AC Duopave 16: Recommendations (1)

AC Duopave		AC Duopave 16
Materials		
Aggregates (production size)		
Ratio crushed aggregate surface		$C_{90/1}$; $C_{95/1}$; $C_{100/0}$
Resistance to crushing		SZ_{22} / LA_{25}
Resistance to polishing		$PSV_{\text{specified}}$ 48
Minimum part of fine aggregates 0/2 with E_{cs} 35	%	50

* less strict than for SMA

AC Duopave 16: Recommendations (2)

* less strict than for SMA

Composition of Asphalt Mixture		
Aggregate mixture		
Passing sieve 22.4 mm	% by weight	100
Passing sieve 16 mm	% by weight	90 - 100
Passing sieve 11.2 mm	% by weight	65 - 75
Passing sieve 8 mm	% by weight	48 - 58
Passing sieve 5.6 mm	% by weight	38 - 45
Passing sieve 2 mm	% by weight	25 - 32
Passing sieve 0.063 mm	% by weight	7 - 11

Binder		
Binder, type and grade		50/70
Minimum binder content	% by weight	B _{min} 5.2
Stabilizing additive (cellulose fibers)	% by weight	≥ 0.2

Asphalt Mixture		
Minimum void content Marshall-Specimen	Vol.-%	V _{min} 2.5
Maximum void content Marshall-Specimen	Vol.-%	V _{max} 3.0

AC Duopave 16: Recommendations (3)

Characteristics of Layer		
Paving thickness	cm	4.0 - 8.0
Degree of compaction	%	98.0
Void content	Vol.-%	5.0
Gritting material		1.0 – 2.0 kg /m ² aggregates 2/5 mm (dedusted or lightly bitumenized)

* variable thickness in one paving step

AC Duopave is based on:

**EUROPEAN STANDARD
EN 13108-1
Bituminous mixtures - Material specifications –
Part 1: Asphalt Concrete**



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

AC Duopave 16 pilot project:



Section: 1.5 km

Layer thickness: 5 cm

June 2008, District road K3321, Federal State of Baden-Wuerttemberg, Germany

AC Duopave 16 pilot project:



2008-2023: 15 years in use without maintenance

Recent AC Duopave projects (examples):

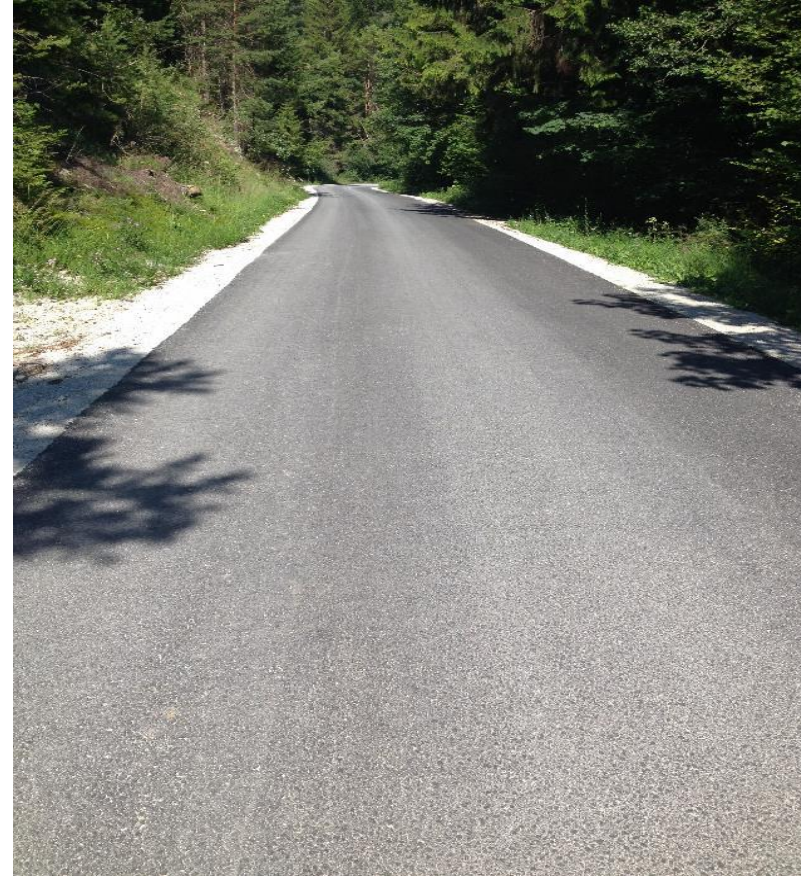


2013, Trier, Rhineland-Palatinate, Germany



2021, Wadern, Saarland, Germany

AC Duopave in Slovenia:



Section: 7.6 km

Layer thickness: 6.3 cm

April 2014, Velika Reka – Radeče



Fibers for Life.

AC Duopave in Hungarian specifications:



„Combined Wearing-Base Course Asphalt Mix AC 16 for Pavement Construction on Low-Volume Roads. Requirements“

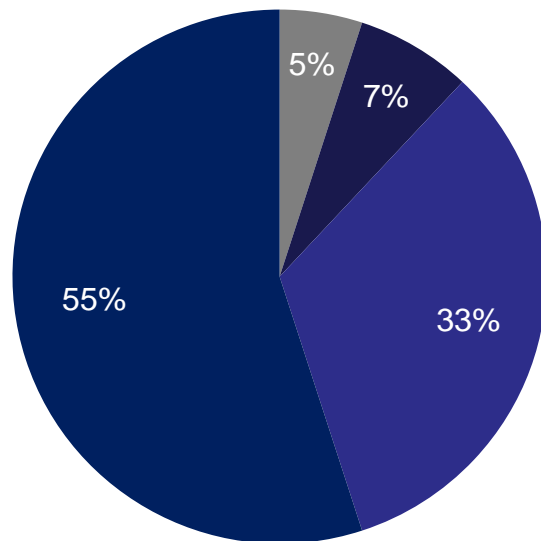


Fibers for Life.

AC Duopave in Poland:



Road Network



- Motorways and National Roads
- State Roads
- District Roads
- Communal Roads



88 % potential for AC Duopave



Fibers for Life.



Challenges of local road administration:

- ➔ Limited budget for new investment or maintenance
- ➔ Maintenance of only 2 % of the total road network per year
- ➔ Deficit of qualified staff
- ➔ “Old school” approach
- ➔ Lack of technical standards and clear procedures for the implementation of new technologies

➔ The biggest challenge: finding a competent local partner

Rettenmaier Polska searched for solutions
for the local road administration



Essential requirement: cost-efficient technology



Solution: AC Duopave



The first AC Duopave trial section in 2013:



Local partner in Poland:



PRZEDSIĘBIORSTWO PRODUKCYJNO – USŁUGOWE „TUGA” Sp. z o. o.

- ➔ **Application of AC Duopave on regular basis**
- ➔ **50 % of the TUGA asphalt production is AC Duopave**



Fibers for Life.

AC Duopave in Dłużniewo in 2020:



AC Duopave in Morawica in 2020:



Advantages of AC Duopave (1):

- ✓ Improvement of local road condition
➡ Sustainability

- ✓ Maintenance in one day possible
➡ Economics

- ✓ Use of RAP possible (up to 30 % cold recycling)
➡ Economics & Sustainability

Advantages of AC Duopave (2):

- ✓ Improved resistance to permanent deformation
 - ➡ Sustainability & Safety

- ✓ Good skid resistance properties
 - ➡ Safety

- ✓ Easy to pave and compact
 - ➡ Economics

Time saving:



In the morning



In the afternoon

Advantages of AC Duopave (3):


- ✓ Paving with variable layer thickness possible
 - ➡ Economics

- ✓ Reduction of construction time, costs and disruptions by single-pass process
 - ➡ Economics

- ✓ Lifetime expectation of minimum 15 years
 - ➡ Sustainability & Economics

Additional information:

AC Duopave
Two In One



Best practice for roads
in counties and communities

Durable
Economic
Versatile

J. RETTENMAIER & SÖHNE **JRS** Fibers designed by Nature

AC DUOPAVE
Two In One

Durable – Economic – Versatile



Roads with lower traffic volumes form a major part of the overall road network. These roads carry multiple loads for the daily supply of smaller villages in counties and communities.

AC Duopave was developed together with experienced asphalt experts to offer a solution for safe, durable and cost-effective roads in these areas.

AC Duopave – the dual purpose asphalt layer, which performs as a base course layer and offers the properties of a surface layer, at the same time – two in one.



The AC Duopave design is perfect for all roads with medium and low traffic, for temporary roads in construction areas as well as for industrial applications.

- durable
- economic
- versatile

These benefits have already made AC Duopave a common technology in many counties, communities and municipalities.

AC Duopave – A dual purpose asphalt layer for maintenance, which performs as a base course layer as well as offering the properties of a surface layer to enhance evenness, stability and skid resistance.

VIATOP®
Das Pellet.



AC Duopave offers

- Improved anti-rutting characteristics
- Good resistance to wear and tear
- Good skid resistance
- A waterproofing surface
- Better service life with lower life cycle costs
- Further cost savings with the addition of reclaimed asphalt

AC Duopave – Two In One!
Durable – Economic – Versatile




BUSINESS UNIT
ROAD CONSTRUCTION

VIATOP®
Das Pellet.

COMPETENT

The VIATOP® Technology
Reliable – Efficient – Economical

VIATOP® premium	VIATOP® 66	VIATOP® plus 62	VIATOP® plus 52	VIATOP® plus 42
for superior durability	for superior durability	plus improved adhesion	plus enhanced compaction	plus reduced process temperatures

At J. Rettenmaier & Söhne Group, we have dedicated ourselves to the research, development and processing of high quality, organic fibers derived from natural and sustainable raw materials. Many features of these valuable natural substances are available for the industry.

Our fiber expertise, application know-how and innovations gave us the reputation being the number one reliable partner for the asphalt industry for more than 30 years. VIATOP® pellets – our fibers with bituminous coating and additional functional additives inside – for decades have been the benchmark for fiber additives delivering the best quality and functionality for modern asphalt concepts. Together with sophisticated road construction experts around the globe, we developed the innovative VIATOP® plus. A wide range of pelletized fiber additives for various additional functions enhance the properties of the final mixes. Get ready for the future – with VIATOP® plus.

www.jrs.de

J. RETTENMAIER & SÖHNE **JRS** Fibers designed by Nature

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➔ Ask for our AC Duopave material!

www.jrs.de

A screenshot of the JRS website's 'AC Duopave' section. The page has a white background with a green header bar containing the JRS logo and navigation links. The main content area features a large title 'AC Duopave Two In One' in green. Below the title is a paragraph of text describing the product, followed by a list of bullet points. To the right of the text is a large photograph of a paved road winding through a green landscape. On the far right, there is a vertical sidebar with a grey background containing links to 'Functional Asphalt Additives', 'Start', 'Applications', 'Products', 'Contact', and 'News'.

Career News Events English ▾

JRS Fibers for Life. The Company Products & Functions Life Science Fiber Solutions Consumer Goods

AC Duopave Two In One

Roads with **lower traffic volumes** form a major part of the overall road network in every country round the world. These roads are **carrying multiple loads** for the daily supply of smaller villages in counties and communities. AC Duopave was developed together with experienced asphalt experts to offer a solution for **long lasting roads** in these areas.

AC Duopave – the name already indicates what the engineers wanted to achieve: **A dual purpose asphalt layer**, which performs as a base course layer as well as offering the properties of a surface layer, at the same time – **two in one**.

The construction method is ideally suited for **district, country and municipal connecting roads** in the load classes Bk 1.8 to Bk 0.3 as well as for access roads in new construction areas and yard and industrial areas.

- Process reliability
- Permanent
- Sustainable
- Economic

Functional Asphalt Additives

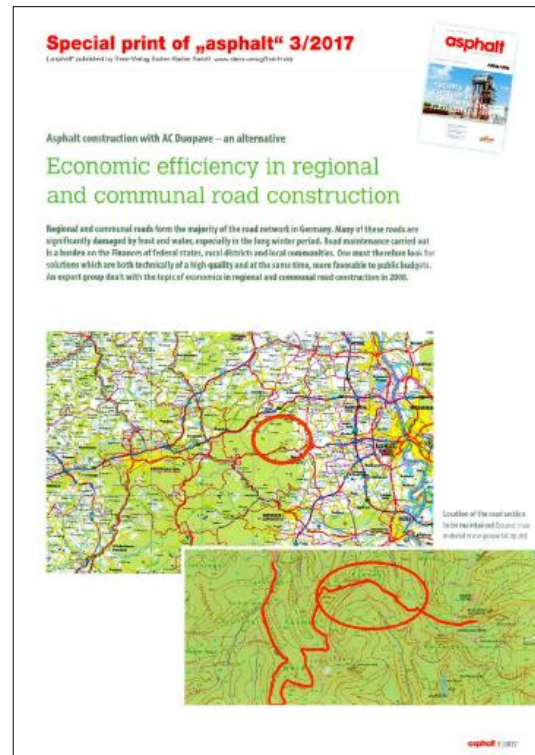
- › Start
- › Applications
- › Products

Contact ▾

News ▾

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Thanks for your attention!

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Das Pellet.