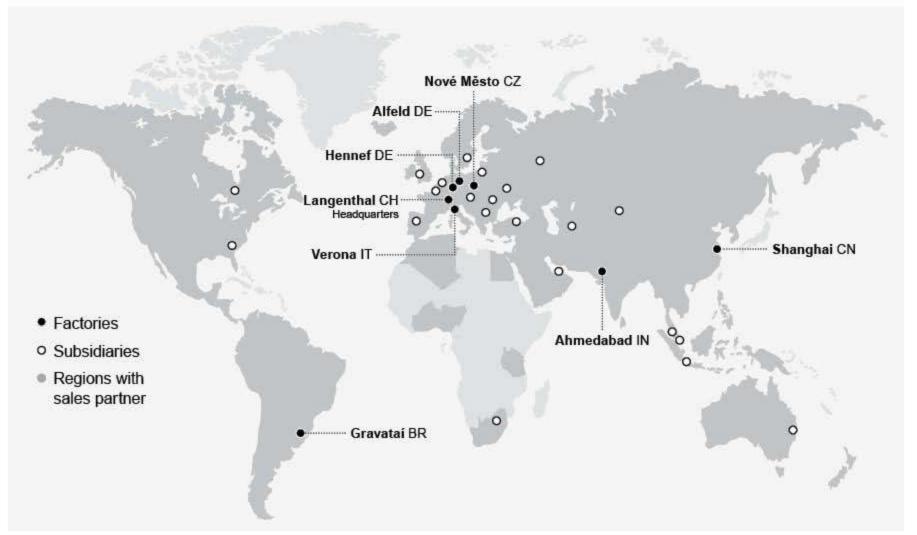


Developments in Asphalt Plant and Equipment

Andreas Biedermann

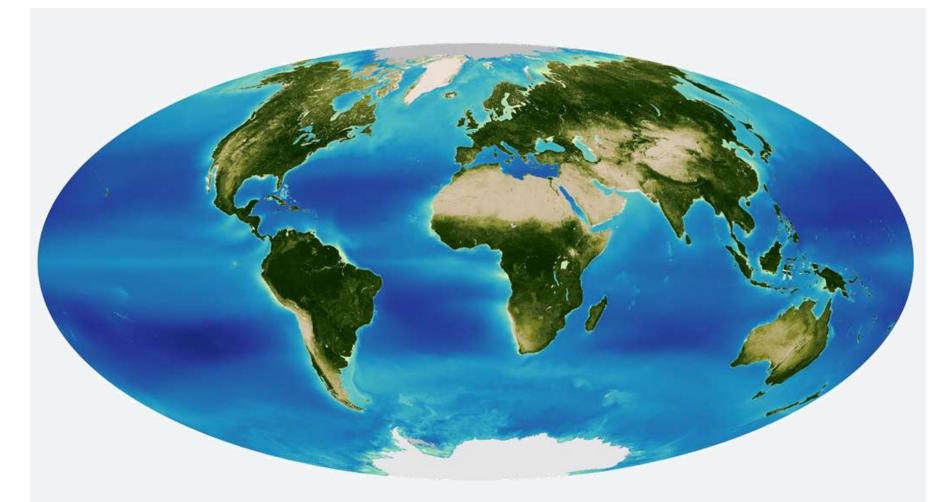
© Ammann Group | For Internal Use Only

Ammann Group Worldwide

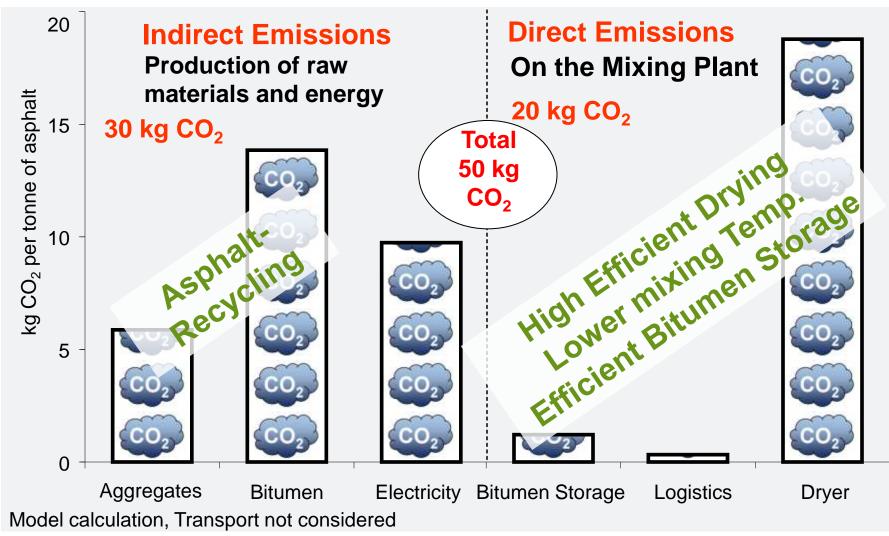




Our Planet

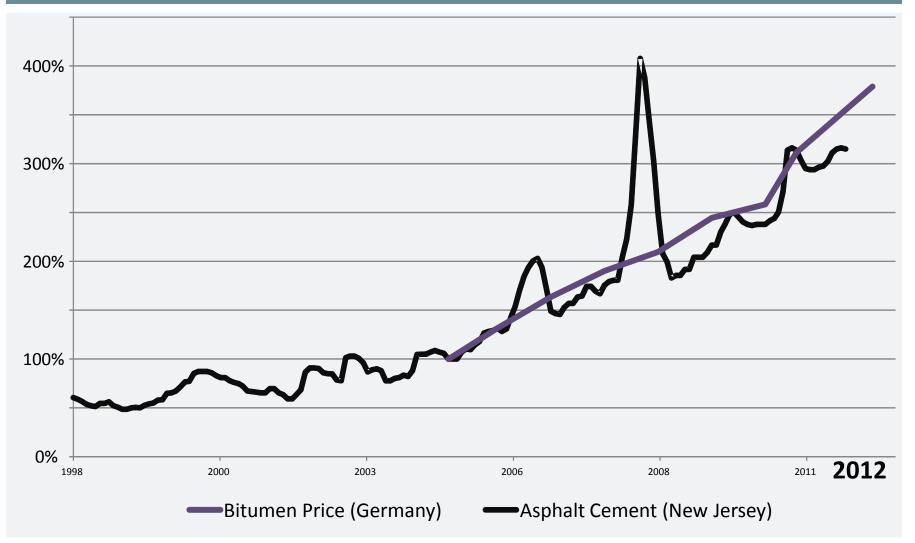


CO₂ Emission per Tonne of Asphalt



Ammann Technology

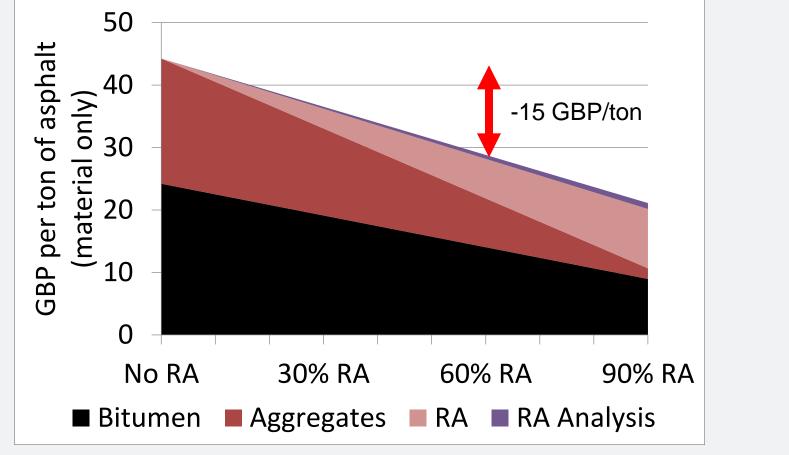
Prices Since 2005: Bitumen +200%



Road Construction - Keeping the Asphalt in the Road



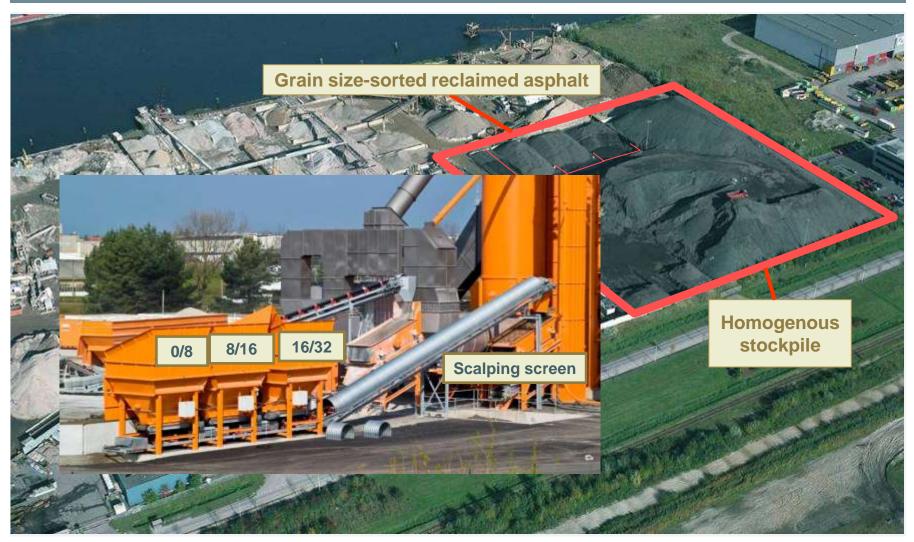
Cost Benefits from Recycling Asphalt (RA)



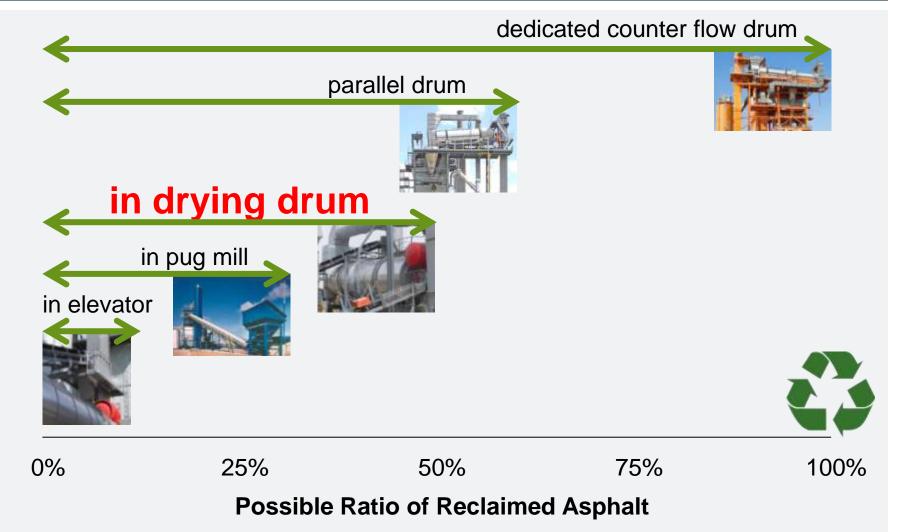
1'500'000 GBP less material costs per year

Estimated costs

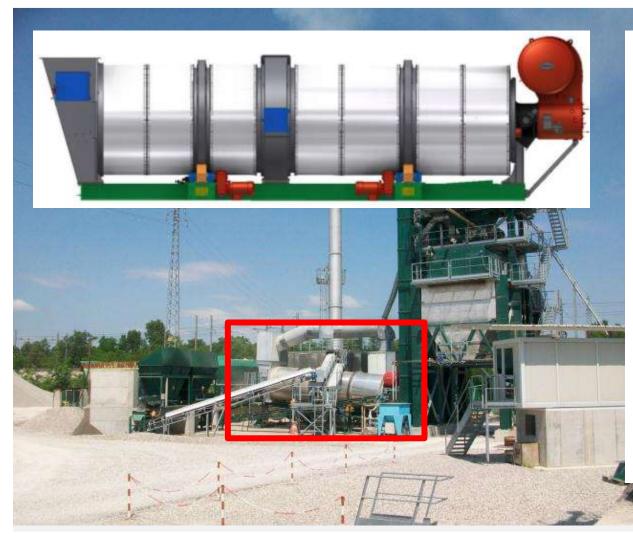
Reclaimed Asphalt – Valueable Resource



Different Techniques To Keep the Asphalt in the Road



RAH 50 – Combined Asphalt Recycling - North-East Italy



Example

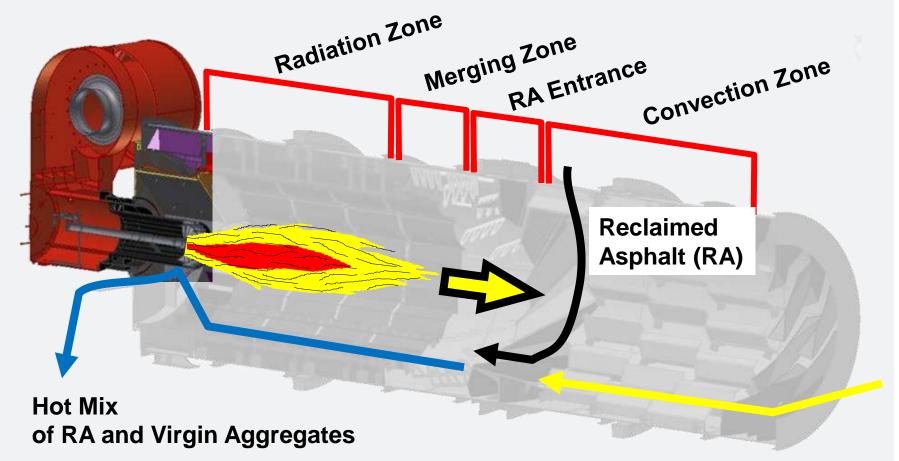
RAH 50: RAP-cold feed in dryer drum

Retrofit on CB 210

First Installation: 3rd may 2010

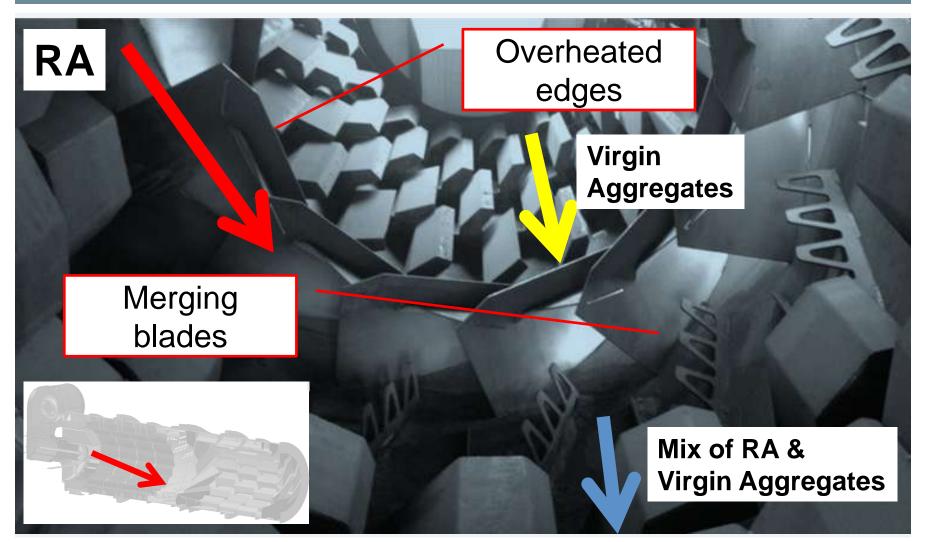
Plant with existing cold recycling line

RAH 50 – Gentle Heating of Reclaimed Asphalt



Virgin Aggregates

Merging of Reclaimed Asphalt (RA) & Virgin Aggregates





RAH50 – Retrofit and New Installation



Rejuvenating Reclaimed Bitumen





http://www.comedix.de

Goals of Using Additives

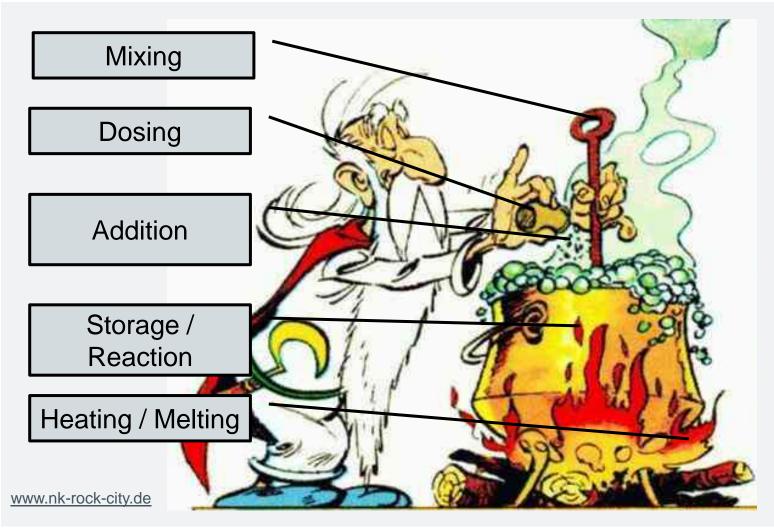
- Low viscosity of binder during asphalt production
- Lower stiffness during compaction
- Higher stiffness at high service temperatures
- Lower stiffness and faster relaxation at low service temperatures
- Substitute a portion of the bitumen
- Improve adhesion and/or coating
- Colorize binder

- Reduce fumes from bitumen
- Reduce or improve foaming
- Rejuvenate bitumen
- Reduce sticking in plant



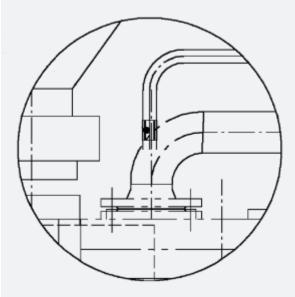


Working With The Magical Essence



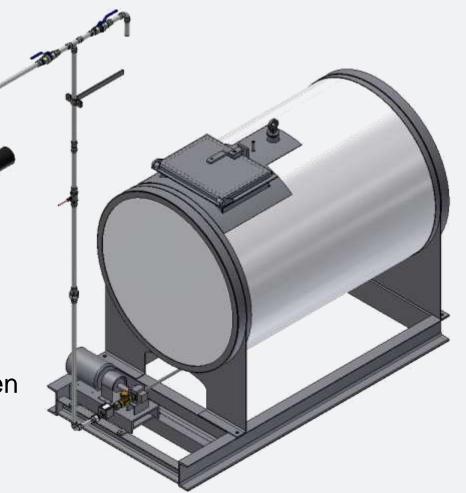


Dope Addition System

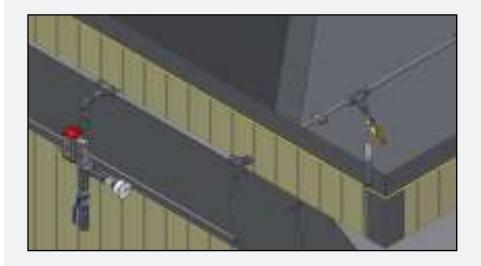


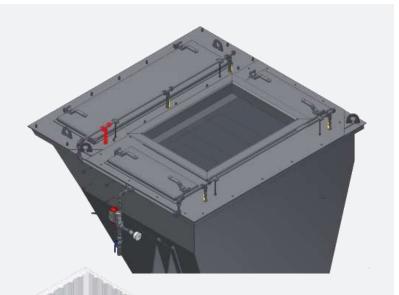
Standard Configuration: 12 l/min 3 tons of asphalt with 5% bitumen

Into Bitumen Stream / Scale



Process Oil Addition



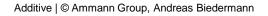


Continuous or batch-wise addition

Heated system

Addition Points:

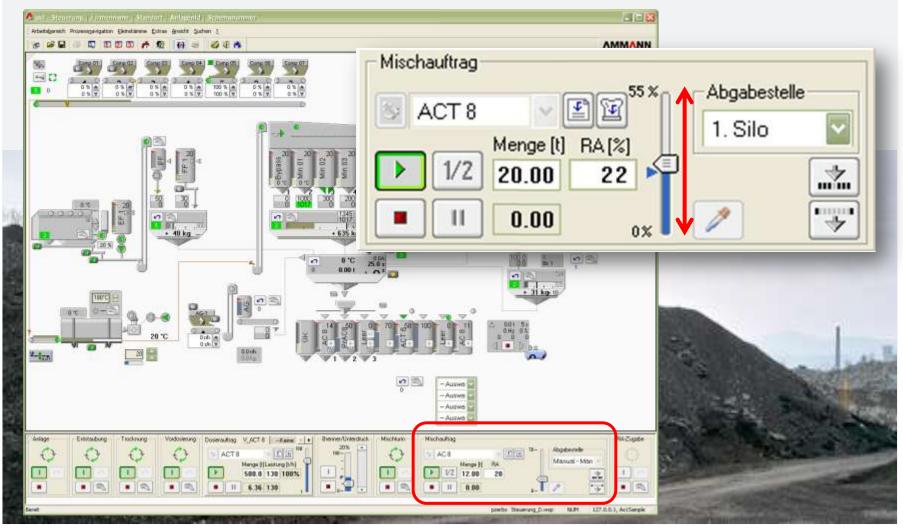
- RA drum
- RA chute / silo
- Mixer



Bitumen Modification Plant - Moditek



Varying the Addition of Reclaimed Asphalt



The Stadium - Where it all comes together

Dynamic RA Addition – Optimal Use of Recycling

Asphalt recipe "2851420 EDRAP"					
🛃 Save and dose 🖸 🖬 🗙 🛷 🗒 🖪 🖪	K < > N 7.9				
- Aphat actor "Plant Aphat 1 - "Poo	duct Arphol	Dispatch point	Manual		
*Identification 2851420 EDRAP *Nee	MC 14 (450) H	D RAP dynamic est			
Total quantity 1000 kg/1 Res	spected quantity 1000	kg/t			
Status Active 🖌 Dale	ivery note without protocol				
Recipe values Components Info Grading curve Op	namic RA addition				
Base sector		Configuration for RA part			-
Show all components	Queste Une Col	Configuration for RA 0 🚆 2			
Component type Component Aphabgrandat RASD (#ALDrin) P_ Mineral (Aphabl AM02 (-Snm) Mineral (Aphabl AM02 (-Snm)	0 kg/t = 424 kg/t = 130 kg/t =	RA10 (-RA10mm)			50 igt
Primarial (Apphalt) AMO4 (- Toman) P Mineral (Apphalt) AMO5 (- Toman) P Mineral (Apphalt) AMO5 (- Toman) P Politier APD5 (- Toman)	250 kg/t == 206 kg/t == 35 kg/t ==	AM02 (-5mm)			424 lg/t
Bitumen ABOL (-C 450) Bitumen ABOS (-C 320)	55 kg/t 💼 0 💼	AM03 (-7mm)			130 kgA
Adjust DA ratio		AMD4 (-10mm)			150 Jup
Adjust RA ratio		AMDS (-14mm)			206 kg/t
continuously		AEF01 (Dust)			35 lg/t
dapt mixing curve	e	A601 (-C 450)	**		55 kgA
to lab results		A605 (-C 320)			00 kg/t
		0% 10% 20% 30%	40% 50% 50% RA part	70% 80% 90% 1	00%
Optimal use of RA	45.0 °C			Resulting quantity 1000 kg/t	Resulting RnB 45.0 °C
during start-up				Meelman RA part 61 \$	🧟 Generale progress
Last thange 2/11/2011 12:21 PM / Mile					



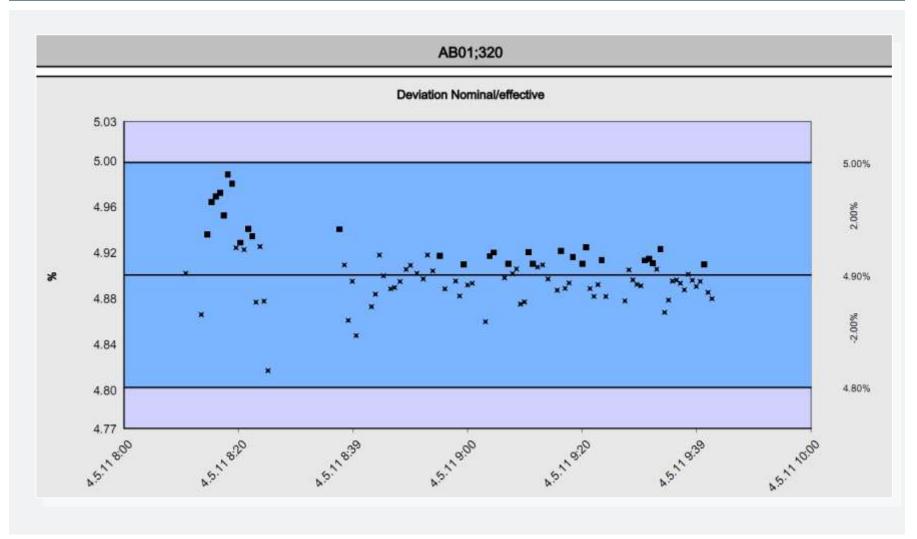
Documented Quality

Protocols

Statistics & listings



Integrated Quality Control Reports



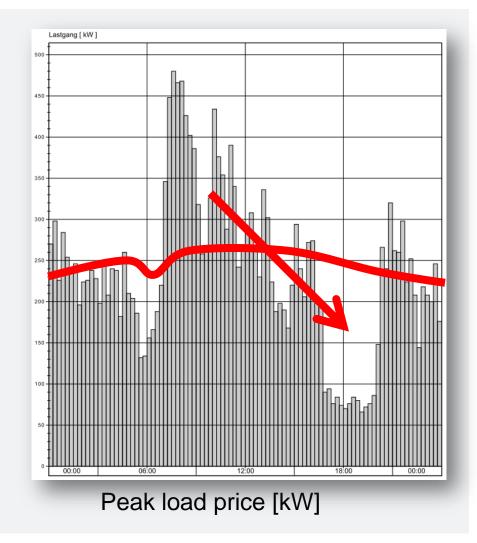
Peak Load Management – for cost saving



Unit price [kWh]

Power peaks cost money

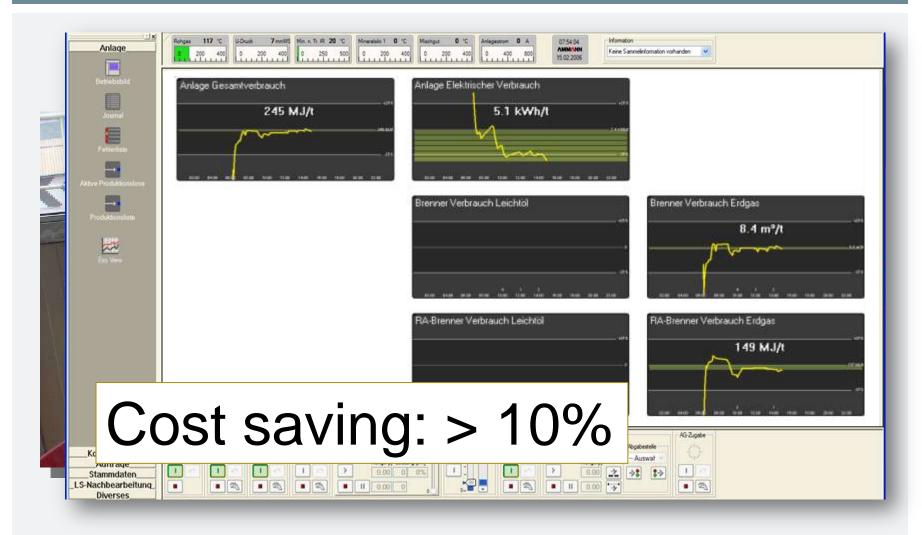
Savings up to 30%



Sample planning and taking

ochobilenos en allang	sniveau (OCL)	Stufe A	in	🚯 Ak	tiviert am 2.6.2006 v	on H. Muster Journa	l]
ntervall		(1					
1indestprüfhäufigkeit	alle	600	t oder wo	ichentlich jew	eils Mittwochs 🛛 d		
ieit letzter Probe proc	luziert	150	t Entnommen am Mi, (.10.2006		
)ifferenz bis zur näch	sten Probe	450	t Spätestens a	t Spätestens am Mi, 11.10.2006			
Varnschwelle		10	% (der Prüfhäufigkeit)				
rüfungen		hanne -					
)ie letzten 32 Untersu	ichungen enthia	elten 2	nichtkonforme Pr	üfungen			
ProbenID		Labor	Prüfer 🗸	Konformität	Menge seit letzter	Lieferschein / Protokoll	17
241	EGZ		A. Frank	Ja	580	501120	
240	EGZ		A. Frank	Ja	580	501120	
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237 236	EGZ		A. Frank	Ja	590	470012	
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236 235 234	EGZ	abor		Ja	200	490123	

Knowing the Process - Online

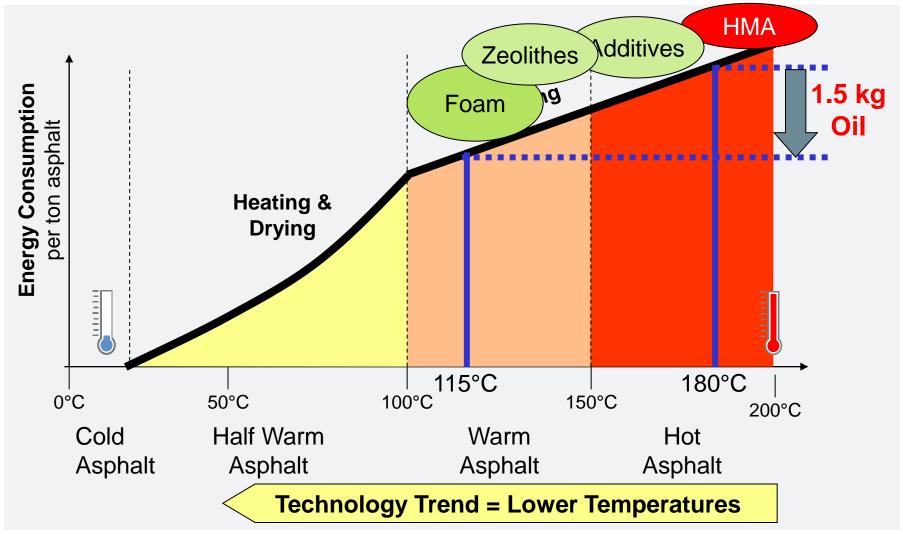


Planning of maintenance interval

Don't wait until it breaks...

Maintenance task	Jul. 2010 10 20	Aug. 201 01 10 20		ep. 2010 0 20	Oct. 21 01 10 2
Another Special Test					
Skip door lubrification				6	
Check Belt tention					
Check belts		EB			
Clean foam bar					
Go into weekend					11 1313333333
Mixer test					
	152 °C		-	-	

Low Temperature – Highest Quality with Lowest Energy

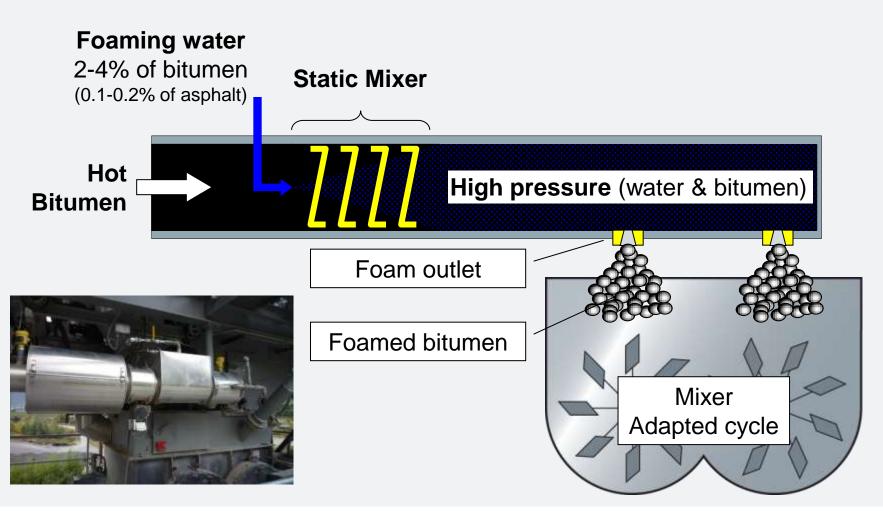




Low Temperature: On Plant and On Construction Site!

	Temperature Reduction			
	On Plant	On Job Site		
Foam Based	++	++		
Wax Based	+	(+)		
Zeolithes	+	+ +		

Ammann Foam Generator – Basic Principle





Bitumen Foaming

Hot Bitumen	Cold Water	Fine Distribution	Bitumen Foam
160°C	2 - 4%	Distribution	i odini
1 litre	0.03 litre		20 litres
5 % of asphalt	0.15% of asphalt		water: <0.05% of asphalt



Switzerland – Foam Bitumen - AC T 22 N - 2011

Hot Mix Asphalt

Foam Asphalt (115°C)



Same crew, same plant, same equipment About 50% RA (cold and warm addition) Equal number of roller passes

Why Ammann Foam?

Low Running Costs

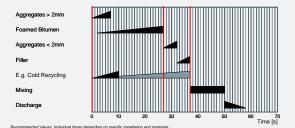
- Energy savings, lower emissions on site
- No license fees
- Use ordinary bitumen, no additives required

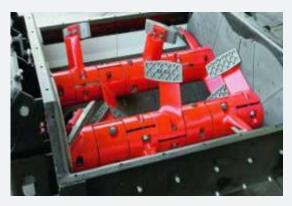
Low Investment

Use existing bitumen pipes

Flexibility

- If desired, add additives in binder scale
- Continuous and batch mixing plants









The Stadium – Where it all comes together

Keeping asphalt in the road.

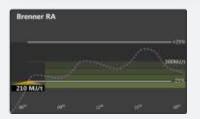
Gently adjust RA addition.

Know the process - Online!

Low Temperature Asphalt Highest quality – lowest energy











Productivity Partnership for a Lifetime

www.ammann-group.com