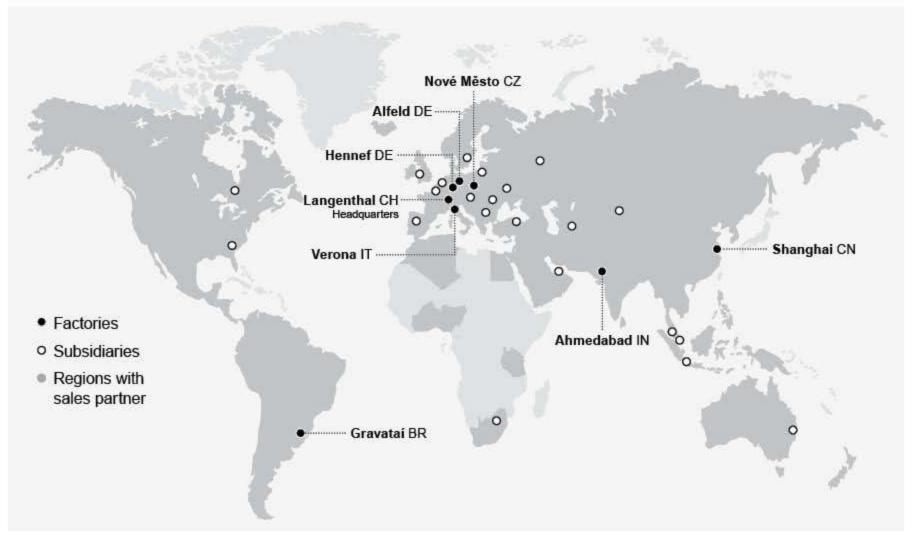


#### **Developments in Asphalt Plant and Equipment**

Andreas Biedermann

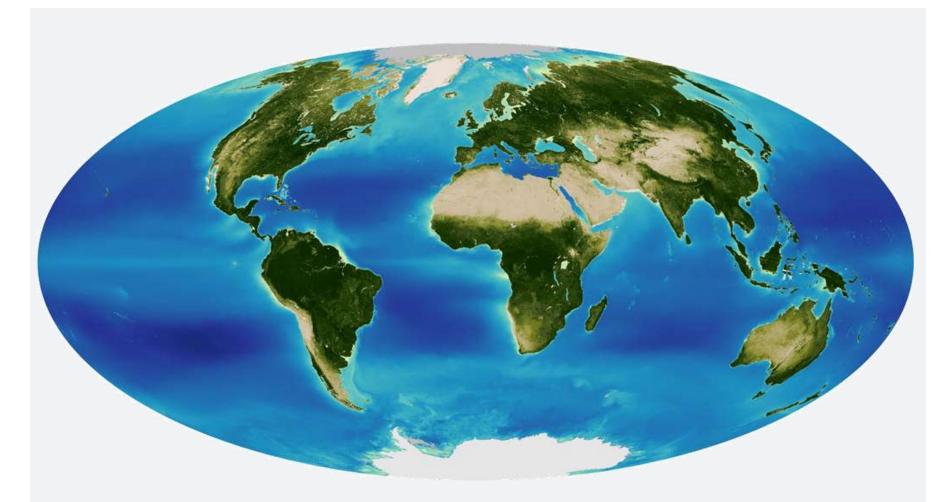
© Ammann Group | For Internal Use Only

#### Ammann Group Worldwide

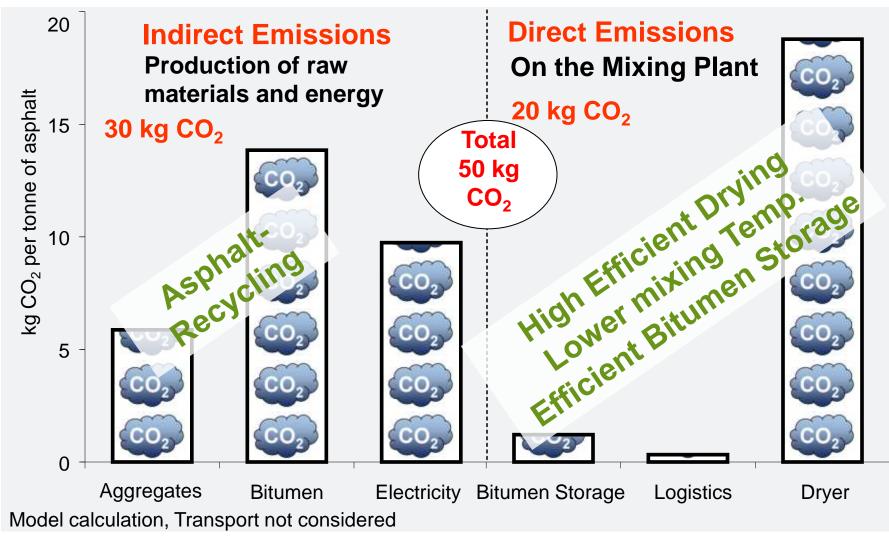




## **Our Planet**

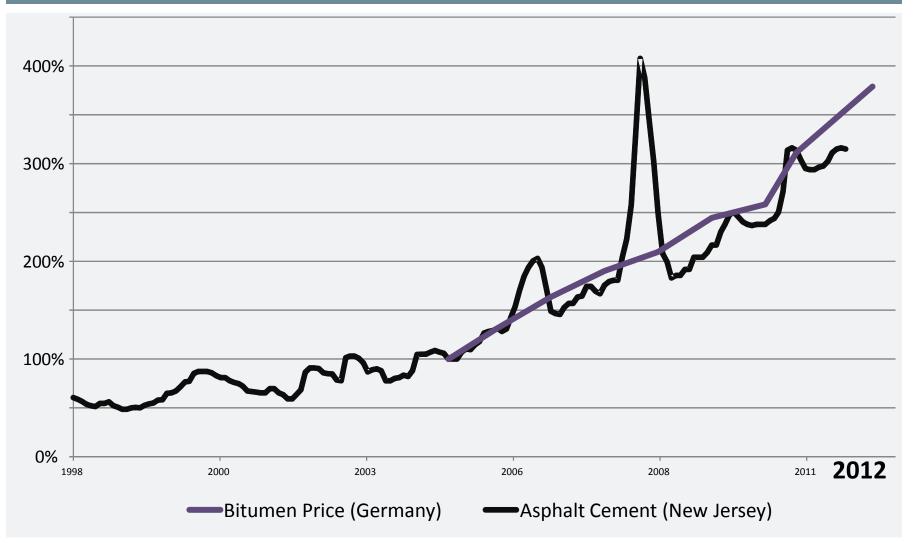


#### CO<sub>2</sub> Emission per Tonne of Asphalt



Ammann Technology

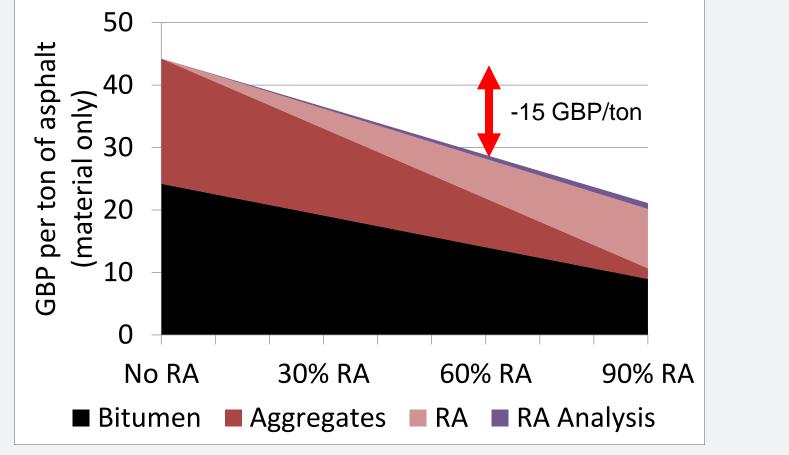
#### Prices Since 2005: Bitumen +200%



#### Road Construction - Keeping the Asphalt in the Road



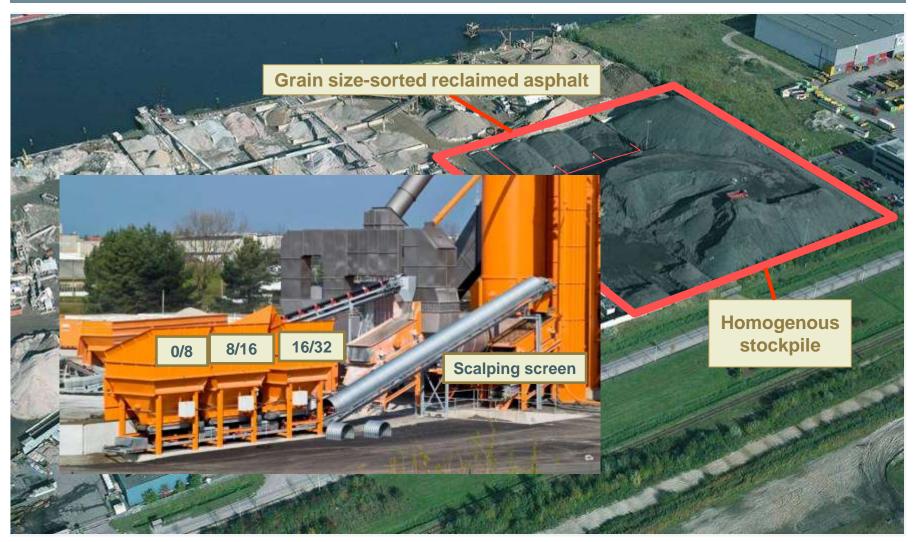
## Cost Benefits from Recycling Asphalt (RA)



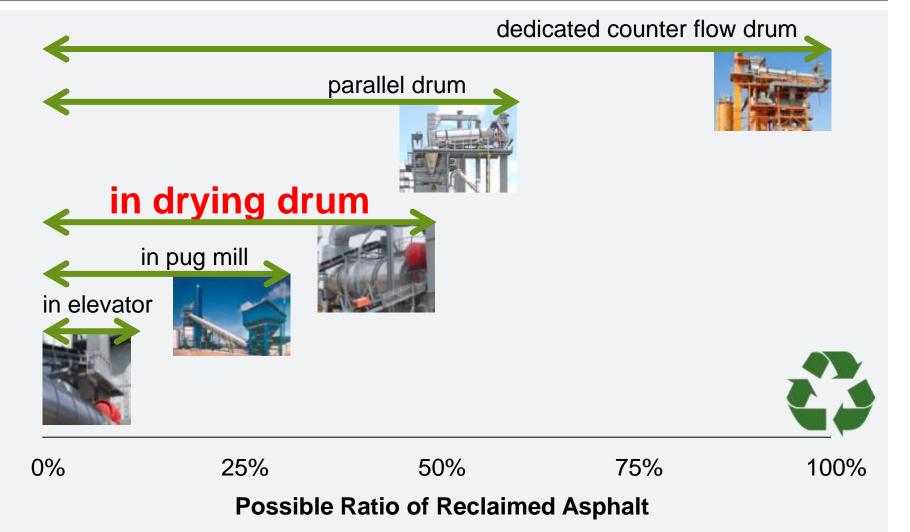
## 1'500'000 GBP less material costs per year

Estimated costs

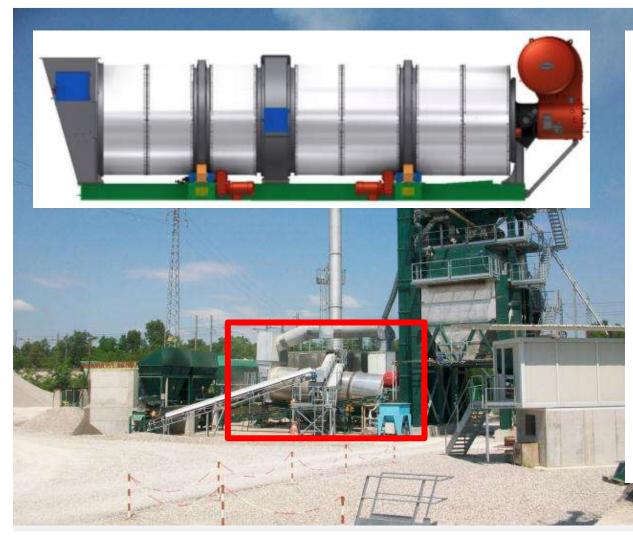
#### **Reclaimed Asphalt – Valueable Resource**



## **Different Techniques To Keep the Asphalt in the Road**



#### **RAH 50 – Combined Asphalt Recycling - North-East Italy**



#### **Example**

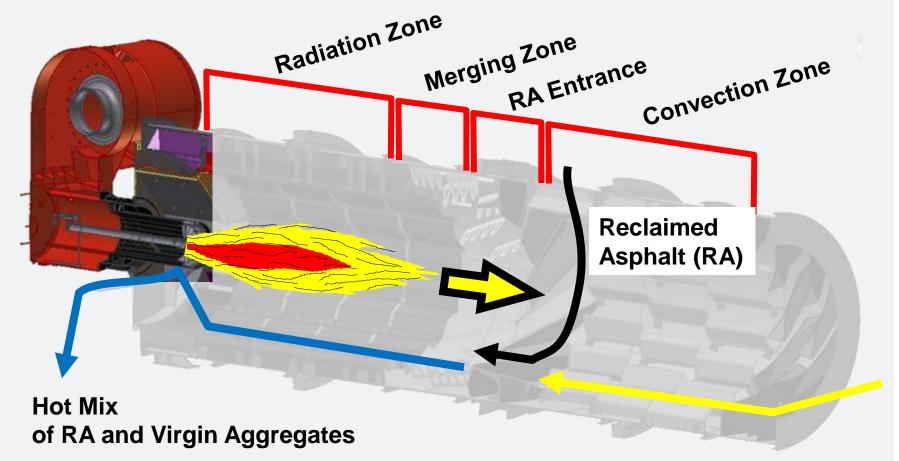
RAH 50: RAP-cold feed in dryer drum

Retrofit on CB 210

First Installation: 3rd may 2010

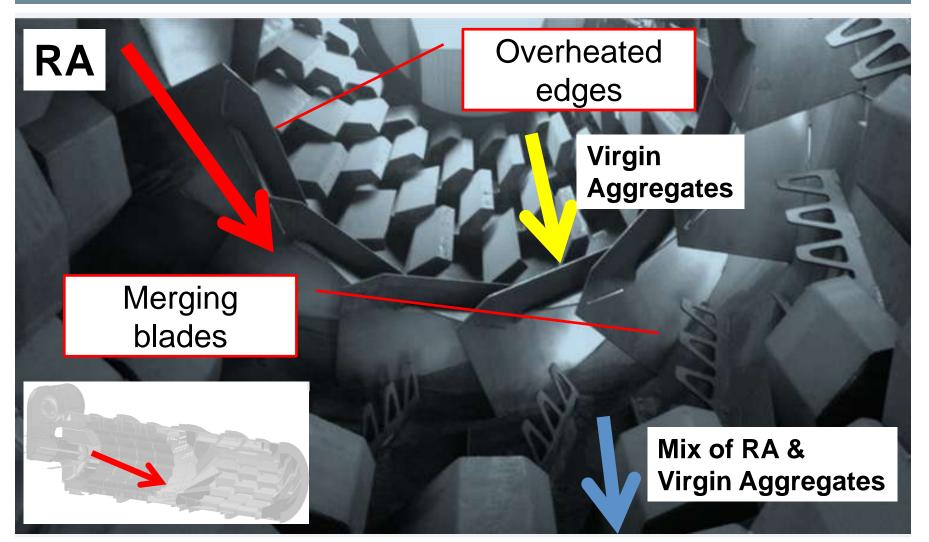
Plant with existing cold recycling line

## **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**

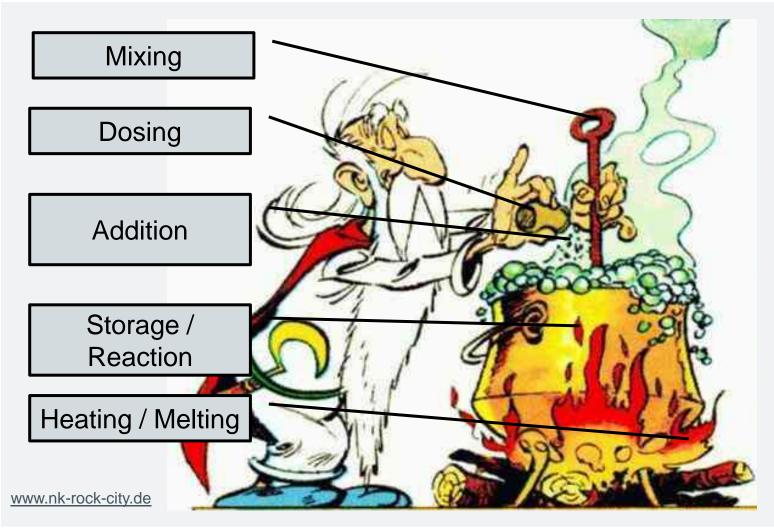
- Low viscosity of binder during asphalt production
- Lower stiffness during compaction
- Higher stiffness at high service temperatures
- Lower stiffness and faster relaxation at low service temperatures
- Substitute a portion of the bitumen
- Improve adhesion and/or coating
- Colorize binder

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



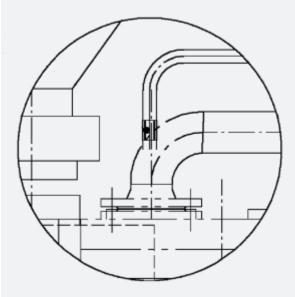


#### **Working With The Magical Essence**



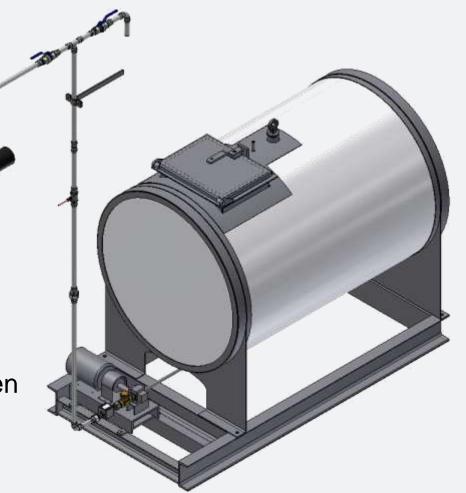


#### **Dope Addition System**

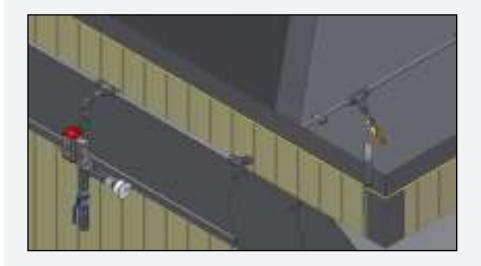


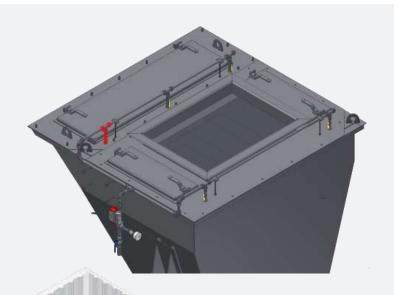
Standard Configuration: 12 l/min 3 tons of asphalt with 5% bitumen

Into Bitumen Stream / Scale



#### **Process Oil Addition**



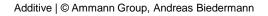


#### Continuous or batch-wise addition

Heated system

#### **Addition Points:**

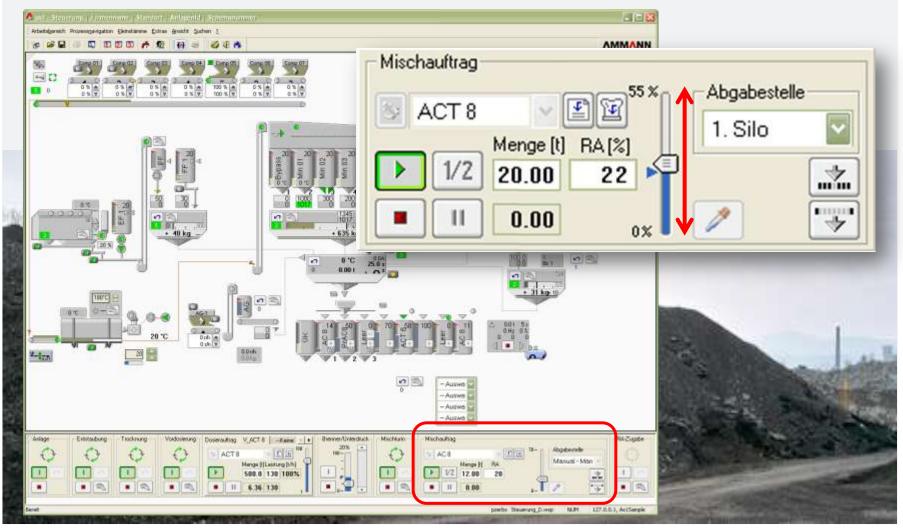
- RA drum
- RA chute / silo
- Mixer



## **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					



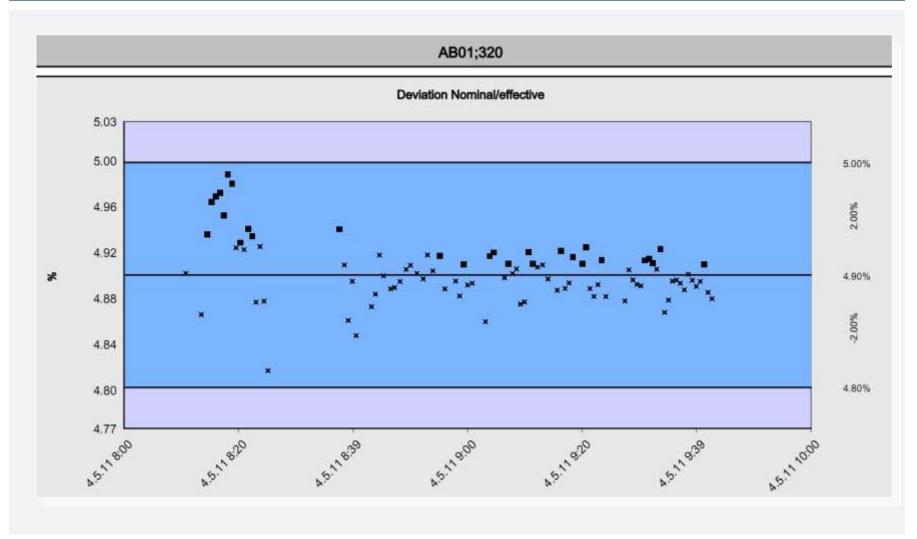
### **Documented Quality**

# **Protocols**

# Statistics & listings



## **Integrated Quality Control Reports**



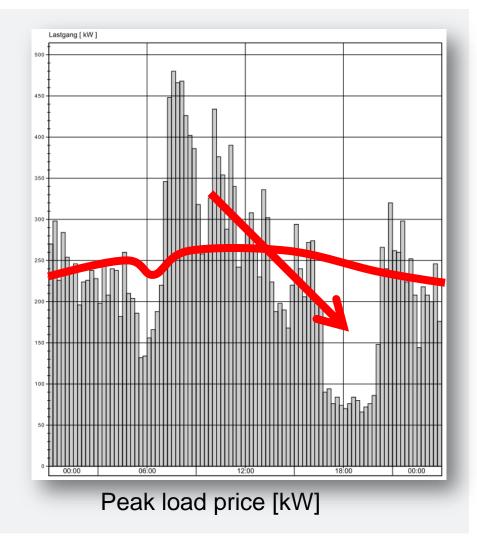
#### **Peak Load Management – for cost saving**



Unit price [kWh]

# Power peaks cost money

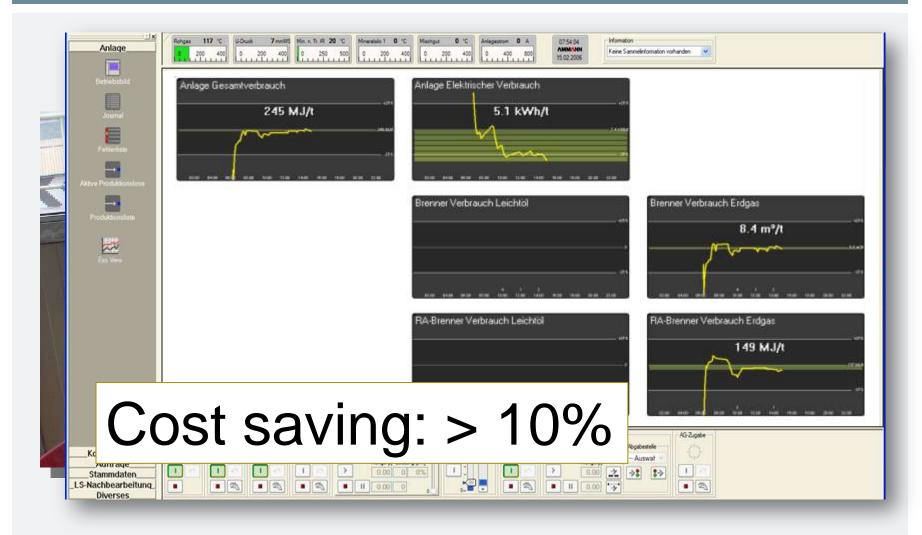
Savings up to 30%



## 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		( <b>1</b>					
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	
239	EGZ		A. Frank	Ja	550	500109	
238	EGZ		B. Tanner	Ja	600	498001	
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#### **Knowing the Process - Online**

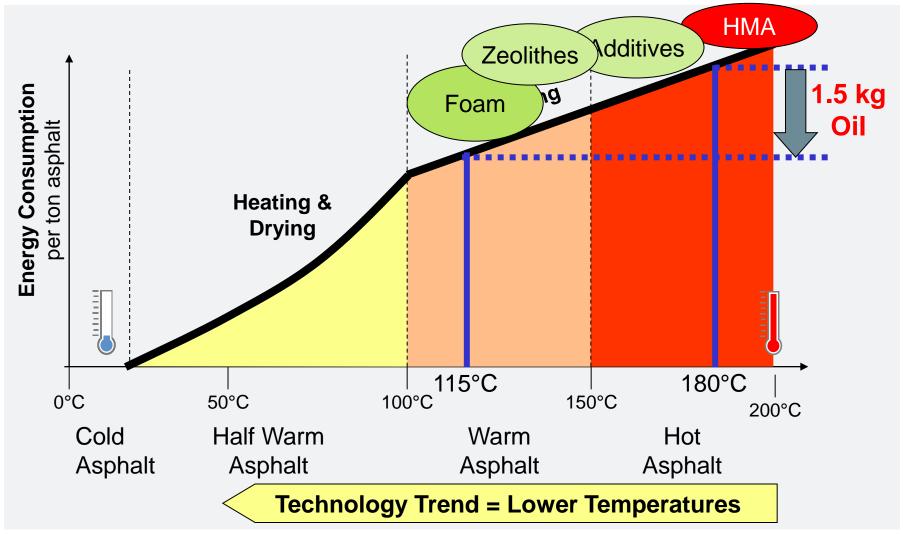


## Planning of maintenance interval

## 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

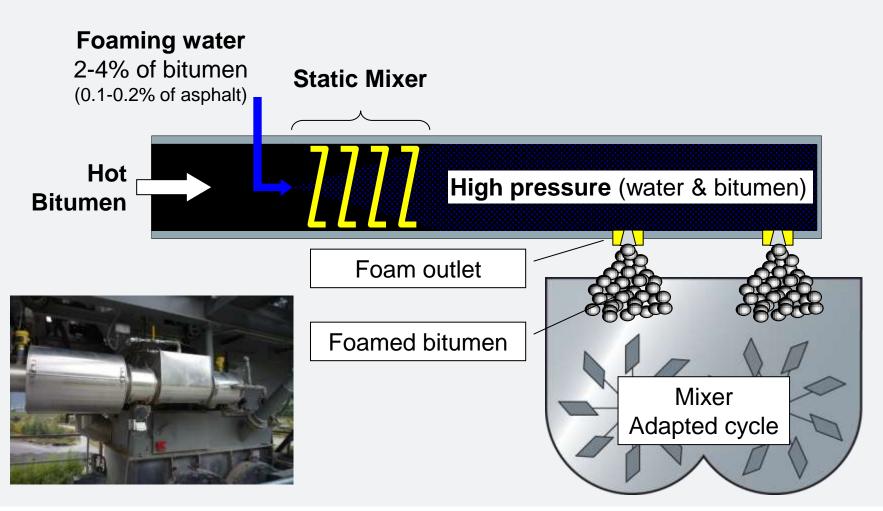




## Low Temperature: On Plant and On Construction Site!

	<b>Temperature Reduction</b>			
	On Plant	On Job Site		
Foam Based	++	++		
Wax Based	+	(+)		
Zeolithes	+	<b>+</b> +		

#### **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

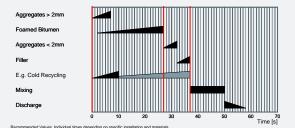
- Energy savings, lower emissions on site
- No license fees
- Use ordinary bitumen, no additives required

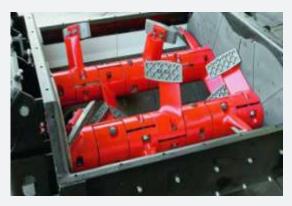
#### Low Investment

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.

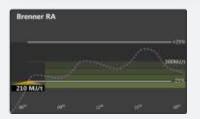
Gently adjust RA addition.

Know the process - Online!

Low Temperature Asphalt Highest quality – lowest energy











#### **Productivity Partnership for a Lifetime**

www.ammann-group.com