# **Advanced Cold Asphalts**

#### HIGH PERFORMANCE ASPHALT COLD MIX FOR POT HOLE AND UTILITY CUT REPAIRS By TODD MELLEMA





#### What is Advanced Cold Asphalt?

 Advanced Cold Asphalt (ACA) are High Performance Asphalt Cold Mixes engineered to provide permanent to near permanent repairs to asphalt pavements.







# What Makes Advanced Cold Asphalts Different?

#### By controlling the process from start to finish.







### Using select specification binders.









#### Utilizing modifiers to improve performance.







# Selecting and testing aggregates to meet strict specification criteria.



			SIS ASTM C 1	17	GRAPH OF EXTRACTED AGGREGATE									
		UPM WW		% Pass Agg	· · · · · · · · · · · · · · · · · · ·									
SIZE	mm	% Pass	Spec. Limits	# 6699	90									
3/4"	19.0	100.0	-	100.0	80									
1/2"	12.5	100.0	100	100.0	70									
3/8"	9.50	99.4	90-100	90.0	60									
#4	4.75	72.7	55-85	60.1	50									
#8	2.36	38.1	32-67	43.8	40									
#16	1.18	27.3	18-48	34.7	30									
#30	0.60	21.0		27.7	20									
#50	0.30	14.2	5-15	16.5	10									
#100	0.15	8.5	-	8.0										
#200	0.075	5.5	2-6	4.9	-200 #100 #50 #30 #16 #8 #4 3/8' 1/2' 3/4'									
Ext	racted A	gg's Neare	est Spec.:	UF	PM WW or									
	Is It With	in Specific	ation?	YES	% Out Of Spec: 0%									
5	Surface A	rea, ft²/lb	(m²/kg)	28.2 ( 5.78	) ft²/lb Agg #6699: 29.1 Sp Gr: 2.659									
ore Inf	ormation of	on Aggregat	te # 6699	PARTIAL	RETEST #6106 LA Abrasion 18.1%									





#### Ensure the manufacturing process is followed as specified.



0		UPM <sup>®</sup> Produ
	Cargoration	
_	UPM is a petroleum outback asphalt, shipped at	elevated temperature
	and is potentially highly flammable.	
	UPM biend has a flash point above 200°F. We s smoking or open flames near the tanker or stora	
	Do not expose the liquid blend or vepors to an o weider, cigarette or lighter.	pen ignition source su
	Do not heat or store UPM blend above 225/F.	
	Anyone involved with the storage or transportation and use appropriate safety equipment.	on of UPM blend mus
	Any and all valves used in the storage and move a torch to heat and free valves.	ement of UPM blend s
	Do not return heated aggregate back to the cold	feed bins.

1000 1000	DOM: UN DOM	A CLEWING	and months	6697	

- Stabilize aggregate temperature before adding UPM blend
- Do not heat apprepate and liquid mixture above 200°F.
- Minimize the use of release agents while mixing.
- Signature Printed Name Printed Name Signature Signature Printed Name
- Signature Printed Name
- Printed Name Signature
- Form 254,124 (04-2011)
- 3003 E. 93rd Street + Cleveland, OH 44105 + Phone 800.441.4880 + Fax 218.34



3953 E. 93rd Street + Cleveland, CH: 44105 + Phone 800, 441, 46

Braduction / Mix Co



UPM® Production / Mix Sample Report

COLUMN 1

		Lab Repo	rt Number	1.40 240 545	·
Production Date	M	s Start Time			End Time
		rkability	Acct #		
Producer Name			Address		
City/State/Zip			Telephone		
Plant Superintendent			Plant Ope	nator	
Was transport weighed in	out? Yes, Net	Neight	No, Re	Neson:	
Blend Source		Targ	pet Viscosity	v	
Mix Grade			IPM/ O	ther:	
Transport Name		Ber	nd Temp		
Arrival Date		Arth	val Time	1	
Were valves checked?	No Yes. By	whom			
Wes sample taken?	Yes No, Rea	son:			
Jar Test Fines 🗌 Increas Ambient Temperature: Lo	_	_			t JMF Up Down tiel / Precipitation:
Stabilized Aggregate Terr Test at 140°F% Bk			Temperatur Temperatur		-'F High'F
Final Biotter Appearance:	Ugh Me	sivm DH	eany		
Initial Stripping Test Action Taken	None Skg		oderate	Subs	tantial
Final Water Strip Test Re	fue	Boa	rd Strip Tes	t Result	
BATCH PLANT: Using	feeder bin(s); u	sing re	cycle bin(s):	produced	¢трн.
Appregate #	Bin 1 pull %	Rs.		Total	Lbs of Agg
Apprepate #	Bin 2 pull %	_ks		Total	Lbs of Agg
Appregate #	Bin 3 pull %	_bs		Total	Lbs of Blend
					g & Blend) Bs.

Form 204,124 (04,2011) Page 1 3553 E. 93rd Street / Cleveland, CH144135 / Phone 800.441.4680 / Fair 215.341.8514 / UniquePavingBlaterials.com





# Make installation recommendations to ensure desired results.

	UPM PRODUCT BULLETIN
-	
	UPM* Permanent Pavement Repair Material
100	
1.04	Content On and Content On and
-	
Y D	Peulos Materiais Par (PE) 14-140
100	UPM" PATCHING QUESTIONS & ANSWERS
puit	OF IN FAIGHING GOLD HONG & ANOMEND
2	Here long will built UPM last in a stockalle?
and a	5.4 data parties (10) to have from the file, make parties but arrest varies to ment works recently, or direct parties.
per	Provide the second se
4.0	For any default includes trademost many to use. Unat they are and of the designs only. Brought on a deep pand part area, then carry trues.
ika -	What is the shell life of bagged UPM?
	Grand Shite bags have a minimum sherilike of 1 page
N: No	Are there seasonal grades of UPM?
	Yest "Phile analysis is sinter, going, lot, and access from day. These goales are designed for optimum performance during from which has performent of goal admin.
	How long doos it this UPM to set up?
'A	Loss arrandos. En espresión est estad interior estas increases cisto encast to terrentete taño. En estas officialitas el control de las terrentes de services de services. Deserving que l'entes de las discustos. (PA inter-
50	Be solve of and a sety are the "to now tang proce since he wild to any off he proceed comp and they represented in control of
6.5	
10	What is the conversion rule of UPBP Approximately 10 bits of UPA per second to all 1 death to expected or spectrum and 14 here alls PM = 1 sole parts
14	te a primer or tack cout needed when applying UPM?
. 9	Net: UNX a substrating. The constrainty light waited used in mendiate by UNX provides beaution strating properties in the substrating units of the area reading rap or
×.	What methods of compaction are surplice?
54	Part segar choicy plus comparing they a computer to your other allow the selection compation. Enforced computer of 270 Me relation of comparing a decided bally of tempts of point string participant and
10	unaltime a barrier second and a second a second sec
	Can UPW be used to patch in extremely wet conditions?
	You you a segred to remanent performance or we take.
	Can UPIR be used for concrete repairs?
	Yes' UNLinear to reparting sinceres personers, instanting tradings and printing and an
	What is the differences between UPM and other septect peticling scattering? UPM works <u>puttectand</u>
	Can UPW patches be overfaid with het mix asphalt?
	Yes? Contraction, manipulations and Topological of Transportation have accounted and provident efford. Transformation contracts or realized
	Per 5 30/04 200 0









# Perform finished product analysis and follow up with recommendations to the improve mix.

Grade Of Mix:		UPM 2.5 SP	X COLD MIX	Produced:	Monday, Se	ptember 19, 2011	Grade O	Mix		UPM 2.0 SP	X COLD MIX		Produced:	Monday, De	cember 12, 201	1
Wt. Received:		13 PC	UNDS	Received:	Friday, Oc	ctober 21, 2011	WL Rea	eived:		9.4 PC	OUNDS		Received:	Thursday, De	ocember 29, 201	11
ST	ANDARD E	XTRACTION (GL	OB IN PILE)	Tested:	Friday, Oc	ctober 21, 2011			STAND	ARD EXTRACT	ION		Tested:	Thursday, J	anuary 05, 2012	2
			ON THIS SAMPLE		UPM BLEND	TERMINAL		BSER	VATIONA	L RESULTS	ON THIS SAM	PLE		UPM BLEND	TERMINAL	
Was sample			YES	LINUT		CEDARBROOK, NJ	Was	ample w	ell conted?		YES		DENVER	INDUSTRIAL (L	ASSCO) OF DE	NVER.
If not, is it ren	nixable?		NOT APPLICABLE	UNIT	LD AGFIIALI, C	SEDARBROOK, NJ			amble ?		NOT APPLICA			ċċ	1	
Temperature	remixable		NOT APPLICABLE		BATCH # UN-11	-35, 0626-11A			wmbcable	-	NOT APPLICA			BATCH # DC-11		
Does it strip in	n water?	. NO	& PASS @ 140F & WEST	Bler	d Vis. = 66	60 cSt at 140°F			Matter?		NO & PASS @	40F	Ellen	d Vis. = 40		40%
is sample coh			YES		E.F.T.R.	1.17			able?		YES			E.F.T.R.	0.99	
Is sample wor			YES, BUT VERY STIFF								GOOD					
Overall Appea			FAIR				CVAR	и Арреал	8/109	VTRACTION	TEST RESUL	TO ACTUO	0470 TEOT	METHOD D		
			TEST RESULTS AST	THE OWNER WATER THE TWO IS NOT THE DESIGNATION.			Perce	nt Bitume		4.93	Target % Bitum			Agg # 97	27 JMF:	
Percent Bitum Percent Moist		9.63	Target % Bitumen: Agg # 9104 Abs.	5.40	Agg # 91			nt Moistu		0.3	A00 # 9727 /			5.4% @		
Percent Moist Percent Minus		2.1	Agg # 9104 Abs. Agg # 9104 -200	0.8%	5%@≥72°F /	5.1%@150°F	Perce	nt Minus	200.	1.3	Agg # 9727 -					
		YSIS ASTM C 1	00	and the second se	F EXTRACTED AC	CORECATE		SIE	VE ANALI	SIS ASTM C 1	117		GRAPH O	EXTRACTED AG	GREGATE	
01	EX 9 TO 8			GIVETIO	EXTRACTEDAC				EX # 89		% Pass Agg					• 100
SIZE mm	% Pass	7	% Pass Agg # 9104			100	SIZE	1000	% Pass	Spec. Limits	# 9727					90
SIZE mm 3/4" 19.0	100.0	Spec. Limits	100.0			90	3/4"	19.0	100.0		100.0					80
1/2" 12.5	100.0	100	100.0			80	1/2"	12.5	100.0	100	100.0			+++		70
3/8" 9.50	97.7	90-100	98.9		- /	70	3.8"	9.50	100.0	90-100	\$9.8					60
#4 4.75	68.9	55-85	46.2		-/-	50	#4	4.75	52.3	20-55	56.2					50
#8 2.36	29.0	5-40	14.2			40	#8	2.38	11.0	5-30	9.7					40
#16 1.18	15.9	0-10	6.6		1	30	#16	1.18	5.8	0-10	4.9			+ 1/+		30
#30 0.60	10.2	-	3.1			20	#30	0.60	4.1 2.8	0.5	3.2					20
#50 0.30	7.8	0-5	1.5			10	#100	0.30	1.8	~	1.9					T'
#100 0.15	6.3	-	0.9	T			#200	0.075	1.3	0-3.5	0.6	-200 #100	#50 #30	#16 #8 #4	3/8, 1/2, 3	4/4"
#200 0.075	5.5	0-3.5	0.6	#100 #50 #30	#15 #8 #4	3/8' 1/2' 3/4'										_
Extracted	Agg's Nea	rest Spec.:	EX 9 TO 89	0	r					est Spec.:		X # 89	6	-		
the second second second	hin Specif		and a second s	Out Of Spec:	5.9% UNDER	RSIZED			uin Specifi Area, ft≑lb		YES	% Out		6.4 Sp Gr:	2.650	_
Surface	Area, ft²/lb	o (m²/kg)	and the second sec	b Agg #9104:	6.4 Sp Gr:	2.667		unace A	40a, 171D	(mvkg)	8.5 ( 1.74	/ RAID Ag	g#9727:	6.4 Sp Gr:	2.000	
More Information	on Aggreg	ate # 9104	MIX DESIGN	]	LA Abrasion	23.3%	More Ink	mation	on Aggrega	to # 9727	MD	DESIGN C.	A. SPX & MIX	LA Abrasion	35.7%	
			C./	A. SPX & MIX @ ≥7	2°F TO 150°F						co	MMENTS				_
The -200 @ 5. 1.17. Extra	5%, S.A. ( cted agg is	@ 22.1 ft²/lb are s within 5.9% of	COMMENT both very high, but with the comb of #9/#89 spe	9.63% blend (due	e to drain out) ga strip tests, cohes	ive a "good" EFTR of sive, but very stiff.	The -200 agg mee	@ 1.3% Is the #8	, S.A. @ 8 19 spec. M	.5 ft∜lb are bol lx doesn't strip	th OK & combine under water (an	d with 4.939	workable & o	ed in a "good" E shesive. AFT @	FTR of 0.99. Ex 1.20 mil is abov	tracled to 90%
(C)		Possible 100 =	69.2		Score	D+		Total P	oints of a l	Possible 100 =			[	Score	A	
Total P	on to of a	1 0331010 100 =	09.2		00016			- Curr Po		000000000	92.	•	L		A-	





## How do you know if you have an ACA?

#### Do a Strip Test.

- 1. Add cold mix to jar
- 2. Add water
- 3. Shake vigorously

If it's an ACA there should be virtually no striping of the oil off the rock. The oil should stick to everything including the inside of the jar.









# Simple Stripping Test – Conventional Cold Mix

Stripping-fine aggregate suspended in water settling on cold mix resulting in cloudy water.





Cold mix stripping in a simple jar test demonstrates performance in the rain.







#### Which mix is the Advanced Cold Asphalt?

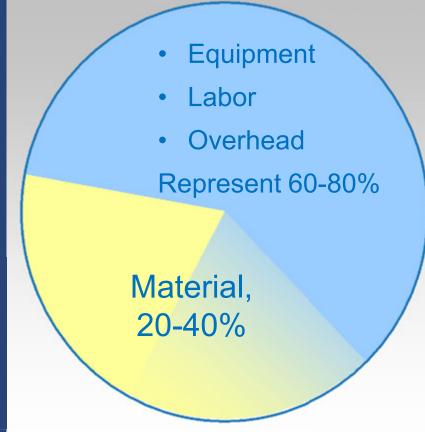








#### Why is all this all this important?



Material cost is not the controlling component when using cold mix.





#### Cost Modeling ACA vs MC Mix

on Koehler 1-19-16	ACA Bra		MC-800 C				Initial Cost	Re-Repair	
Components of Total Cost			Initial Repair		Cold Mix	Source	to Repair	Cost	Total Cost
Cold Mix price , \$/ton		\$150.00	\$90.00	\$90.00					
Cold Mix usage, total tons/Year		_		50					\$176,00
Cold Mix usage, tons/month			8	4	MC-800 Cold				
Cold Mix pounds/pothole	e 50			50		Т	OTAL Savin	g with UPM	\$55,00
Cold Mix Survivability	y <mark>90%</mark>	10%	50%	50%				Saving	24%
Labor Cost, \$/hour w/ burden	n \$35.00	\$35.00	\$35.00	\$35.00					
Equip/Fuel Cost, \$/hr	r \$40.00	\$40.00	\$40.00	\$40.00	\$250,000				
Number of Crews	2	. 2	2	2		AC	A Brand A \$	150/ton	
Men per Crew	3	3	3	3	\$200,000 -	= MC	-800 Cold M	lix \$90/ton	-
Potholes repaired per hour		8	8	8					\$231,000
Labor Cost/Pothole, \$				\$26.25	\$150,000			0	31,
Equip/Fuel Cost/Pothole, \$				\$10.00		8 8		00	\$2:
Material Cost/Pothole, \$				\$2.25	\$100,000 -	\$160,000 154,000		\$77,000 \$176,000	
Total Cost of Single Pothole, FIRST REPAIR				\$38.50		<mark>\$150,000</mark> \$154,000	\$16,000	<u>\$</u>	
Potholes/month			333	167	\$50,000 -		6,0		
Potholes/year		400	4,000	2,000	\$00,000		\$		
Initial Cost to Repair			\$154,000		\$0 -				
Re-repair Cost, \$/Year		\$16,000		\$77,000	<b>4</b> 0 -	Initial Cost	to Re-Repa	ir Cost Tot	tal Cost
Tons of Cold Mix required			150	•	l	Repair	to Renepa	il oust i ot	
	esources								
Initial Cost Savings to Repair using UPM			6,000						
Savings using UPM based on Re-repairs	\$61,000				Ma	any decis	ione	Thic	IS the cos
Total Saving using UPM		\$5	5,000		and the second se				
Yellow cells are variables; Other cells are ca	alculated	_			are	made on	initial		acting you oudget.

Pavement Preservation

Solutions



## Cost Modeling ACA Brand A vs ACA Brand B

on Koehler 1-19-16	ACA Bra		ACA Br		Cold Mix	Course	. 0	nitial Cost	Re-Repa	air	Total Cos
Components of Total Cost			Initial Repair			Source	*	to Repair	Cost		I otal Cos
Cold Mix price , \$/ton				\$150.00						_	
Cold Mix usage, total tons/Year	100	10	100	20	ACA Brand		_	\$160,000		_	\$176,0
Cold Mix usage, tons/month			8	2	ACA Brand	B \$150/t		\$160,000			\$192,0
Cold Mix pounds/pothole				50			TO	TAL Saving		_	\$16,0
Cold Mix Survivability	90%	10%	80%	20%					Savi	ng	8
Labor Cost, \$/hour w/ burden	\$35.00	\$35.00	\$35.00	\$35.00							
Equip/Fuel Cost, \$/hr	\$40.00	\$40.00	\$40.00	\$40.00	\$250,000						
Number of Crews	2	2	2	2			AC	A Brand A	\$150/ton		
Men per Crew	3	3	3	3	\$200,000		AC	A Brand B	\$150/ton	i	~
Potholes repaired per hour		8	8	8						4.3	\$192,000
Labor Cost/Pothole, \$	\$26.25	\$26.25	\$26.25	\$26.25	\$150,000		-			8	32,
Equip/Fuel Cost/Pothole, \$	\$10.00		\$10.00	\$10.00		\$160,000	\$160,000			\$176,000	\$15
Material Cost/Pothole, \$	\$3.75	\$3.75	\$3.75	\$3.75	\$100,000 -	00	80,		0	117	
Total Cost of Single Pothole, FIRST REPAIR	\$40.00		\$40.00	\$40.00	•100,000	23	\$1	8	8		
Potholes/month		33	333	67	\$50,000 -			\$16,000	\$32,000		
Potholes/year	4,000	400	4,000	800	\$50,000			5	69		
Initial Cost to Repair			\$160,000								
Re-repair Cost, \$/Year		\$16,000		\$32,000	<b>\$0</b> +	Initial C	ost tr	Re-Repai	ir Cost	Tota	I Cost
Tons of Cold Mix required	110		12	0		Repa		Ne-Nepa	il COSt	Tota	TOOSL
						1	1				
Initial Cost Savings to Repair using UPM											
Savings using UPM based on Re-repairs		Ma	nu de			Th	ie li	S the co			
Total Saving using UPM		\$1	6,000		Many decisions						
					are	made	oni	nitial	im	ipad	cting you

Pavement Preservation

Solutions



#### Advanced Cold Asphalt Producers









#### AOUAPHALT













#### Advanced Cold Asphalt Applications

Advanced Cold Asphalt can be used in almost any asphalt pavement repair where the sides and bottom of the hole is sound.





Honey, I hit a small pot hole ...





# Utility Cuts







## Skin Patch Repairs







#### Pot Holes







#### More Pot Holes







#### When should one use ACA's

- High Performance Cold Mixes or ACA's were originally developed to be utilized in the winter months when Hot Mix was not available.
- However today they used year round for a variety of uses.







## Patching is like Painting

#### The end result is only as good as your prep work.







### **Installation Best Practices**

#### Hole Preparation

- Clean the Hole
- Get rid of any loose chucks of asphalt or concrete.
- Sweep out hole.
- Ensure the mix has something to adhere to.
- Water does not need to be removed.







#### Hole Preparation



 Make sure there is no ice, snow or loose debris in the repair site





#### **Concrete Joints and feather patches**

- Imperative that the hole is dust free.
- Sweep or blow out!
- ACA's will stick to whatever it contacts.

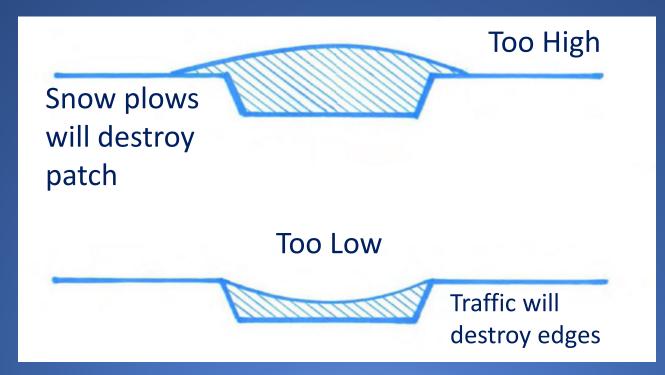






## Crowning

 Proper crowning will leave patches at the proper level once fully compacted

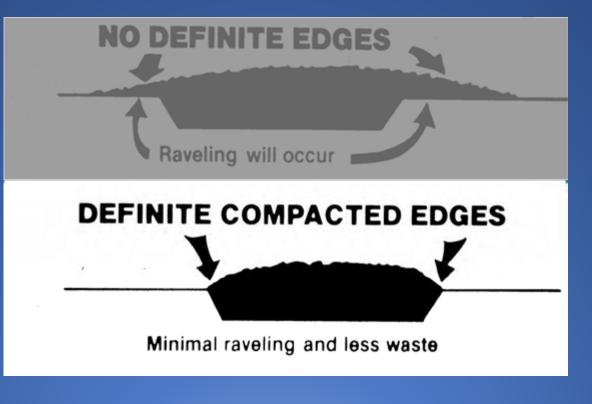






# Edging

- Definite compacted edges work best.
- Keep material over the hole, do not go beyond.

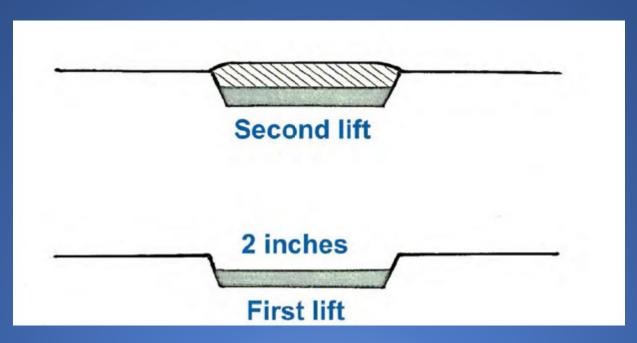






# Layering

- Patches deeper than 3" should be applied and compacted in separate lifts.
- Proper compaction can not be achieved with lifts deeper than 2".
- Pushing and rutting can occur.







# Priming

- Most primers or tack-coats are emulsions and needs to "break" to be effective.
- Emulsions are not effective in cold weather, the tack will freeze before it "breaks".
- Most ACA's are self priming. No primer is necessary.





#### **Compaction Methods**



Truck Rolling





Plate Compactor



Roller



Hand Tamper



## Simply Drive Over It







#### Throw & Go is NOT effective







# Neglected Repairs Can Grow









# **Application Steps**

- Use common sense
- Follow simple procedures
- Attitude!!









### Clean the Hole

#### • Use a broom, blower or air compressor but clean the hole.







#### Remove Large Chunks & Remove Crack Filler







#### Remove Paving Fabric







## Compact the Base







#### Install The First Lift







### Compact







# Place Final Lift & Compact







### Dust Coat With Portland & Open To Traffic







# Anyone Notice?

- Occasionally it's obvious the reason quality varies.
- To consistently reproduce premium results requires the control of critical parameters every time.
- That is what Advanced Cold Asphalts are all about.







Thank you

# Questions?

Presented By

Todd Mellema DISSCO 303-935-2485



