Oklahoma Department of Transportation – Perspective on Mine Chat

Chat has a Long History as a safe road building material.

- Used in hot mix asphalt
- Excellent performance
- Extremely hard
- Durable
- Excellent skid resistance

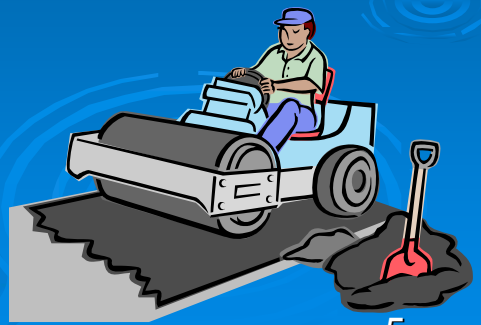
Organization of Presentation

- Supply and Demand of mine chat
- Specifications
  - Asphalt
  - Aggregate
- Asphalt mix designs using chat

Chat Supply --- Plenty

Chat Demand

- Demand --- ??
- Chat is used as an aggregate in making asphalt
- Chat demand depends on asphalt projects
- Chat must compete with other aggregate sources in the marketplace



Highway Project – chat demand

- If funding is available:
- Project is designed, Let to bid
- ODOT selects Contractor (low bid)
- Contractor → Asphalt Plant
- Asphalt Plant → Asphalt Mix
- Asphalt Mix → Aggregates (chat)
- Chat suppliers

Asphalt Mix

- 5 % Asphalt binder (oil)
- 95 % Aggregates (rock and sand)

Price of asphalt mix strongly influenced by cost of aggregates.

Price of aggregates strongly influenced by hauling costs.

Counties where mine chat is used

Oklahoma Counties -
Projects using mine chat.

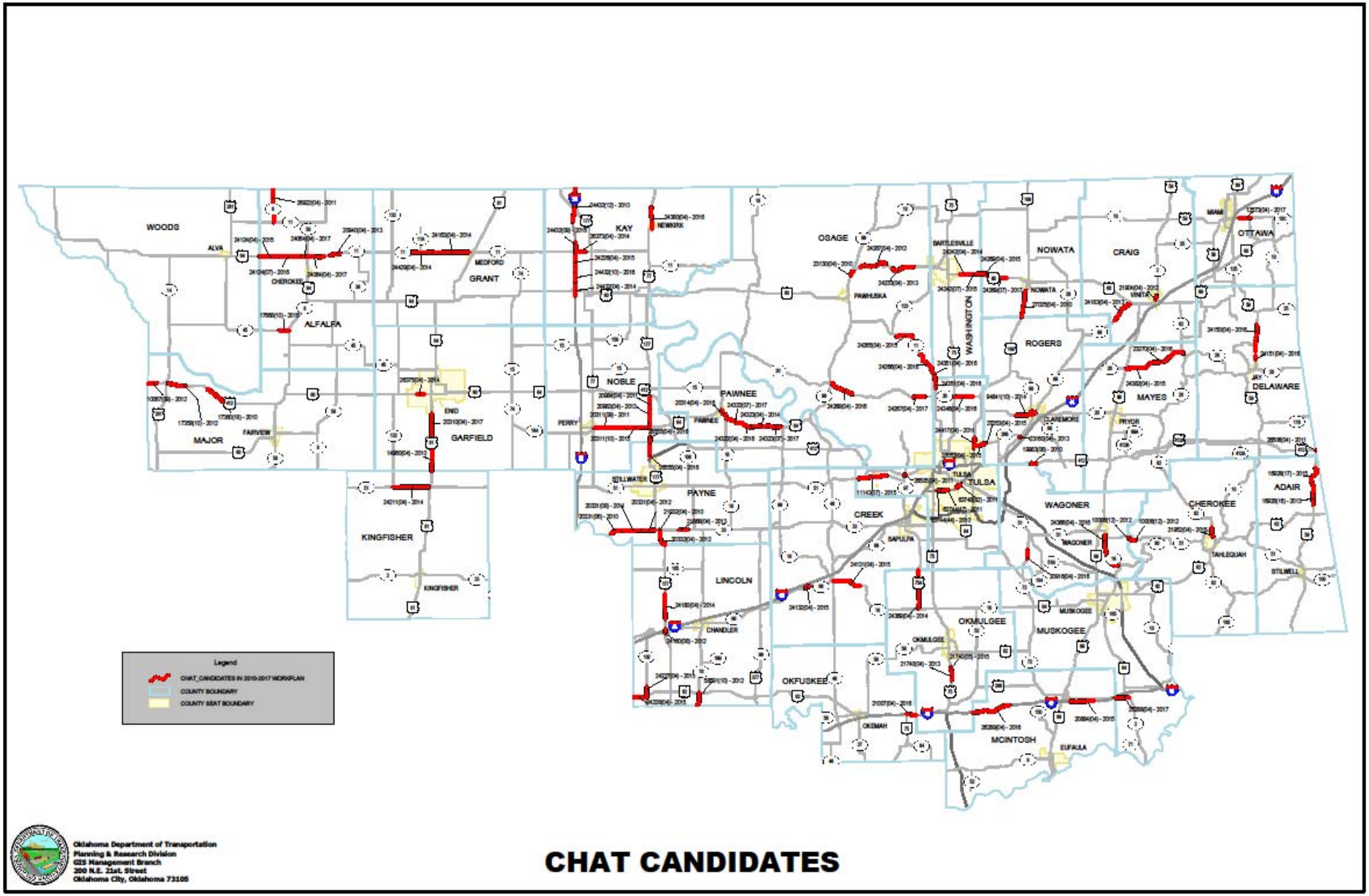
Example Project

- 5000 TONS hot mix asphalt
- 95 % is rock (4700 TONS)
  - Approx. 120 – 150 truckloads
- Assume 25% of rock is mine chat
- 1200 TONS of mine chat needed

Chat usage
(Oklahoma DOT projects)

- **2008 Summary**
  - 325 total projects
  - 96 with mine chat
  - 75,500 TONS of mine chat used
- **2009 Summary**
  - 440 total projects
  - 89 with mine chat
  - 98,000 TONS of mine chat used

ODOT - Planned Projects: 2010 - 2017



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CHAT CANDIDATES

Specifications

- Performance of an asphalt road is strongly influenced by the properties of the aggregates used in the hot mix asphalt.
- ODOT specifications define aggregate properties that must be met.

Aggregate Specifications

- **Quality:**
  - Hardness
  - Durability
  - Shape, angularity, texture
  - ► Resistance to polishing ◄
- **Size:**
  - Gradation or particle size analysis

Mine Chat improves skid resistance on asphalt roads

- Pavement skid resistance is based on the aggregate used.
- Requirement for surface layer
- Aggregate test: Insoluble residue

"Insoluble" Asphalt Mixes are used on the top lift or layer of a road to create safe, skid resistant asphalt roads.

Counties where mine chat is used

Oklahoma Counties -
Projects using mine chat.

Aggregate Size

- Measured by Gradation Test
- Most chat is processed prior to shipment
  - Alter gradation and/or wash out “fines”

- Each truckload sent to an asphalt plant must be consistent from truck to truck

Example Mix Design Tulsa & Rogers County

OKLAHOMA DEPARTMENT OF TRANSPORTATION Mix Design Report

Asphalt Concrete, Type S4 (PG76-28OK)	asco010	Insoluble
(Material Full Name and Material Code)		(Design Type)
APAC-Oklahoma, Inc.	m00552	S4qc0060600803
(Producer/Supplier and P/S Code)		(Mix ID)
		3M+
		(ESALs)

MATERIAL	SOURCE	%USED
3/4" Chips	APAC-Oklahoma, Inc. @ Tulsa, OK(7204)	16
Mine Chat	Flint Rock @ Picher, OK(5805)	29
Screenings	APAC-Oklahoma, Inc. @ Tulsa, OK(7204)	33
Manufactured Sand	APAC-Oklahoma, Inc. @ Tulsa, OK(7204)	10
Sand	Holliday Sand @ Bixby, OK(7212)	12
Asphalt Cement (PG76-28OK)	NuStar @ Catoosa, OK(m00347)	

Aggregate Percent Passing	3/4" Chips	Mine Chat	Scrns	Man. Sand	Sand	Combined Aggregate	Job Formula	JMF Toleran
3/4"	100					100	100	± 0
1/2"	65					94	94	± 7
3/8"	34	100	100	100		89	89	± 7
No. 4	2	46	79	84	100	60	*55	± 7
No. 8	1	6	53	52	87	35	*34	± 5
No. 16	1	2	34	36	63	23	***23	± 4
No. 30	1	1	20	19	37	13	13	± 4
No. 50	1	1	18	11	12	9	9	± 4
No. 100	1	1	14	7	3	6	6	± 3
No. 200	1.4	0.7	11.3	5.7	1.0	4.8	4.8	± 2
%AC (PG76-28OK)							**4.8	± 0.4

Example Mix Design 2

Version: V02.23

Oklahoma Department of Transportation Mix Design Report

Asphalt Concrete, Type S3 (PG 76-28 OK) Mat'l. Code: asco007
(Material Full Name and Material Code)

Binder ID: B1
(Design Type and Design Type ID)

Tulsa Asphalt Co P/S # m00355
(Producer/Supplier Name and Producer/Supplier Code)

S3pv0110901900
(Mix ID)

Tulsa Asphalt Co (Owasso, OK) - 400TPH PLANT ID # m00355-01
(Plant Name and Plant ID)

30M+
(ESALs)

Aggregate	Producer/Supplier	% USED
#67 Rock	Anchor Stone (Owasso, OK) P/S # m001156603	20
1/2" Chips	Anchor Stone (Owasso, OK) P/S # m001156603	20
Mine Chat	Flint Rock (Picher, OK) P/S # m002025805	15
Scrns.	Anchor Stone (Owasso, OK) P/S # m001156603	30
Sand	Anchor Sand, Delaware St. (Jenks, OK) P/S # m001137217	15

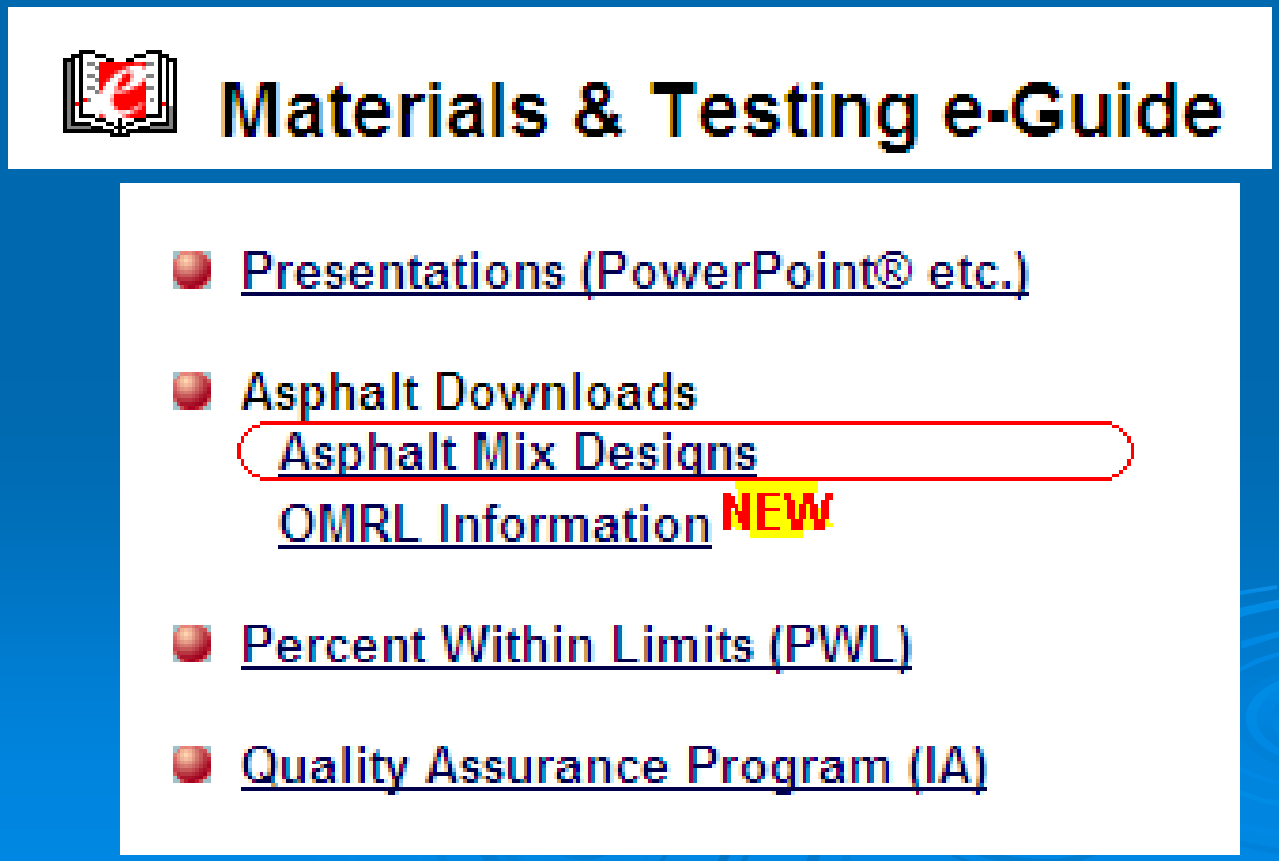
Tulsa County

Example Mix Design 2

Producer/Supplier:	*Anchor Stone (Owasso, OK) P/S # m001156603*	*Anchor Stone (Owasso, OK) P/S # m001156603*	*Flint Rock (Picher, OK) P/S # m002025805*	*Anchor Stone (Owasso, OK) P/S # m001156603*	*Anchor Sand, Delaware St. (Jenks, OK) P/S # m001137217*
Sieve Size	#67 Rock	1/2" Chips	Mine Chat	Scrns.	Sand
1 in (25 mm)	100	100	100	100	100
3/4 in (19 mm)	96	100	100	100	100
1/2 in (12.5 mm)	39	99	100	100	100
3/8 in (9.5 mm)	12	95	99	100	100
#4 (4.75 mm)	2	30	45	97	100
#8 (2.36 mm)	2	7	5	73	89
#16 (1.18 mm)	1	4	3	52	69
#30 (.600 mm)	1	3	2	37	40
#50 (.300 mm)	1	3	1	28	10
#100 (.150 mm)	1	2	1	23	1
#200 (.075 mm)	1.0	2.0	0.2	18.9	0.3
AC Content %					

Website – Asphalt mix designs

- **Google: *ODOT Materials***



Conclusion

- **Chat:**
- Many decades of safe use in asphalt
- Smart use of a waste product – recycle
- Real benefits and value
- Better performing, safer highways
- Encourage smart common sense laws and regulations of mine chat to encourage it's continued use in asphalt roads.

Questions ?