



Material costs taking a toll on your budget?
Looking for a more cost effective solution?

Fine Gradation Chip Seals Using Lightweight Aggregate

Missouri Department of Transportation Awards Highest Honor to Lightweight Aggregate In 2007 . . . and again in 2008.

Each year MoDOT maintenance forces seal thousands of miles of roads across the state. In 2007 the department implemented a new program developed to showcase their employees' talent, dedication and commitment to quality. The program is known as the "Chip Seal Performance Challenge."

What is the goal of this program? To identify the most efficient and cost effective chip sealing process. How does the program work? Each district is allowed to submit their best chip seals for consideration in the challenge. The submitted routes are evaluated by a team of judges who travel around the state. The team is a diverse group of industry professionals including MoDOT maintenance, construction and community relations divisions, along with contractors and asphalt suppliers from the private sector.

The routes are evaluated on the following criteria:

- Quality
- Cost
- Appearance
- Claims

And the winners were . . .

First Place 2007 – Fine Aggregates
Lightweight Aggregate - 1/8" x 0"
Clay County, Rte. C, District 4 (Kansas City)

First Place 2008 – Fine Aggregates
Lightweight Aggregate - 1/8" x 0"
Clinton County, Rte. 116, District 1 (St. Joseph)

Lightweight Aggregate = Reliability

"...the real winners are the 1,600 Clay County motorists who travel along Route C in the county's northern portion on a daily basis"

– MoDOT District 4 Exchanges Newsletter, Spring 2007

Life Cycle Comparison of Fine Graded Lightweight Aggregate (LWA) Versus Normalweight Sand Aggregate in Chip Seal Applications

2008 Example Using Summertime Oil Prices

Normalweight Aggregate Chip Seal

	Example	Your Calculations
1. Total installed sand seal cost per mile for 22'-wide (12,907 SY) road	\$15,500	\$ _____
2. Number of years in normal maintenance cycle (service life)	3 years	_____ years
3. Sand seal cost per year per mile (Line 1 ÷ Line 2)	\$5,167	\$ _____
4. Normalweight sand cost per ton, delivered to job site	\$9.00	\$ _____
5. Normalweight sand cost per lb (Line 4 ÷ 2,000 lbs/ton)	\$0.0045	\$ _____
6. Normalweight sand design spread rate, lbs/SY	16 lbs/SY	_____ lbs/SY
7. Normalweight sand tons/mile ((Line 6 x 12,907 SY/mile) ÷ 2,000 lbs/ton)	103 tons/mi	_____ tons/mi
8. Normalweight aggregate cost per mile (Line 5 x Line 6 x 12,907 SY/mile)	\$929	\$ _____

Lightweight Aggregate (LWA) Chip Seal

9. LWA cost \$/CY, delivered to the job site	\$42.00	\$ _____
10. LWA design density, lbs/CY	1,510 lbs/CY	_____ lbs/CY
11. LWA cost per lb (Line 9 ÷ Line 10)	\$0.0278	\$ _____
12. LWA design spread rate, lbs/SY	8 lbs/SY	_____ lbs/SY
13. LWA CY/mile (Line 12 x 12,907 SY/mile ÷ Line 10)	68 CY/mi	_____ CY/mi
14. LWA cost per mile for a 22'-wide road (Line 11 x Line 12 x 12,907 SY/mile)	\$2,871	\$ _____
15. Additional cost of LWA vs. normalweight aggregate (Line 14 - Line 8)	\$1,942	\$ _____
16. Total installed cost of LWA chip seal (Line 1 + Line 15)	\$17,442	\$ _____
17. LWA seal service life, years. LWA chip seal paving typically exceeds the service life of normalweight sand by 2 years (Line 2 + 2)	5 years	_____ years
18. LWA chip seal cost per year per mile (Line 16 ÷ Line 17)	\$3,488	\$ _____

Cost Comparison

19. Life-cycle cost savings per mile using LWA ((Line 3 - Line 18) x Line 17)	\$8,395	\$ _____
20. Life-cycle cost savings per SY using LWA (Line 19 ÷ 12,907 SY/mile)	\$0.65	\$ _____

PLUS these additional cost advantages when using fine LWA . . .

- Less traffic interruption because of longer service life
- Fewer dump trucks, fewer drivers and less fuel required from dump site to chip spreader
- Windshield and paint damage reduced; liability to the public minimized
- Reduced dust protects the public safety and the environment
- Improved skid resistance; will not polish with wear
- Reduces aggregate pull-out from asphalt during snow plowing

For Additional Information about High Performance Lightweight Aggregate, Contact

Specifications:
 Material varies by region –
 Typically minus 1/8”
 with minimal passing the
 #100 sieve
Typical Emulsion Shot:
 Rate: 0.16 - 0.20 gal/SY
Suggested Applications:
 Low Traffic: rural or urban



Expanded Shale, Clay and Slate Institute
 Rotary Kiln Structural Lightweight Aggregate

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