

Potholes and Their Effects on Wages



Verlaunte Hawkins, Owen McFetridge

Choose **Ohio** First

Abstract

In Cleveland, potholes have become a major issue facing people when driving on roads. They can cause hazardous road conditions, which can not only damage cars, but also severely harm people in those cars. However, even with these problems, many potholes are not repaired as efficiently as they could be. There is already many ways potholes can be dealt with, but not every pothole can be filled at once. This study will examine the cost of repairing a typical pothole. By examining how much a worker makes, how much the material costs, and find out the trends on how potholes form, we can determine the most effective way of maintaining roads. Since there are many ways of repairing potholes, we can also see which method is the most efficient at preventing potholes in the future, while still driving down cost.

OBJECTIVES

- Find the most cost efficient way to to reduce the plague of potholes in areas with climate similar to Ohio.
- Find what type of asphalt is viable depending on the season

Region	Number of drivers suffering pothole damage	Average cost of repairing damage	Total cost of repairs for all drivers
South East England	941,000	£114.93	£108,149,130
London	733,000	£124.65	£91,368,450
Yorks & Humber	720,000	£120.00	£86,400,000
South West England	721,000	£119.01	£85,806,210
Eastern England	457,000	£163.68	£74,801,760
North West England	687,000	£87.01	£59,775,870
Scotland	521,000	£109.02	£56,799,420
West Midlands	609,000	£87.59	£53,342,310
East Midlands	365,000	£86.33	£31,510,450
North East England	343,000	£72.66	£24,922,380
Wales	201,000	£61.83	£12,427,830
Great Britain	6,298,000	£108.60	£683,962,800

METHODS

- Use reports made about potholes from government websites and articles
- Look for a correlation between size of potholes and the cost to fix the pothole
- Found charts for the reports made about the pothole and the cost estimates to fix the potholes

Pavement Management Program Treatment Costs per Lane Mile

Treatment Type	Applicable Rating Range	Treatment Cost/ Lane Mile
Crack Seal	80-95	\$1,500
Slurry Seal / Micro Surfacing	70-85	\$15,000 - \$25,000
Cape Seal (ST+SS)	60-75	\$30,000 - \$50,000
Hot Mix Asphalt Overlay	50-65	\$100,000 - \$200,000
Full Reconstruction	Less than 55	\$500,000 - \$650,000

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Pothole repairs can typically cost range from \$50 to \$600. This varies based on how fast the car is going, and how large the pothole is.

Asphalt is typically cheaper than concrete, costing as little as \$2.50-\$4.00 per sq ft. Concrete is about \$4.00-\$6.00 per sq ft. Repairs are also easier with asphalt. (great daily improvements)

However, concrete does last longer (about 40 years) as opposed to asphalt (about 20 years.) Concrete is also more durable.

Workers make as little as minimum wage (\$7.25), or as much as \$28 an hour. Usually, the amount made is about \$13-\$20, according to indeed.com. This is across the whole U.S.

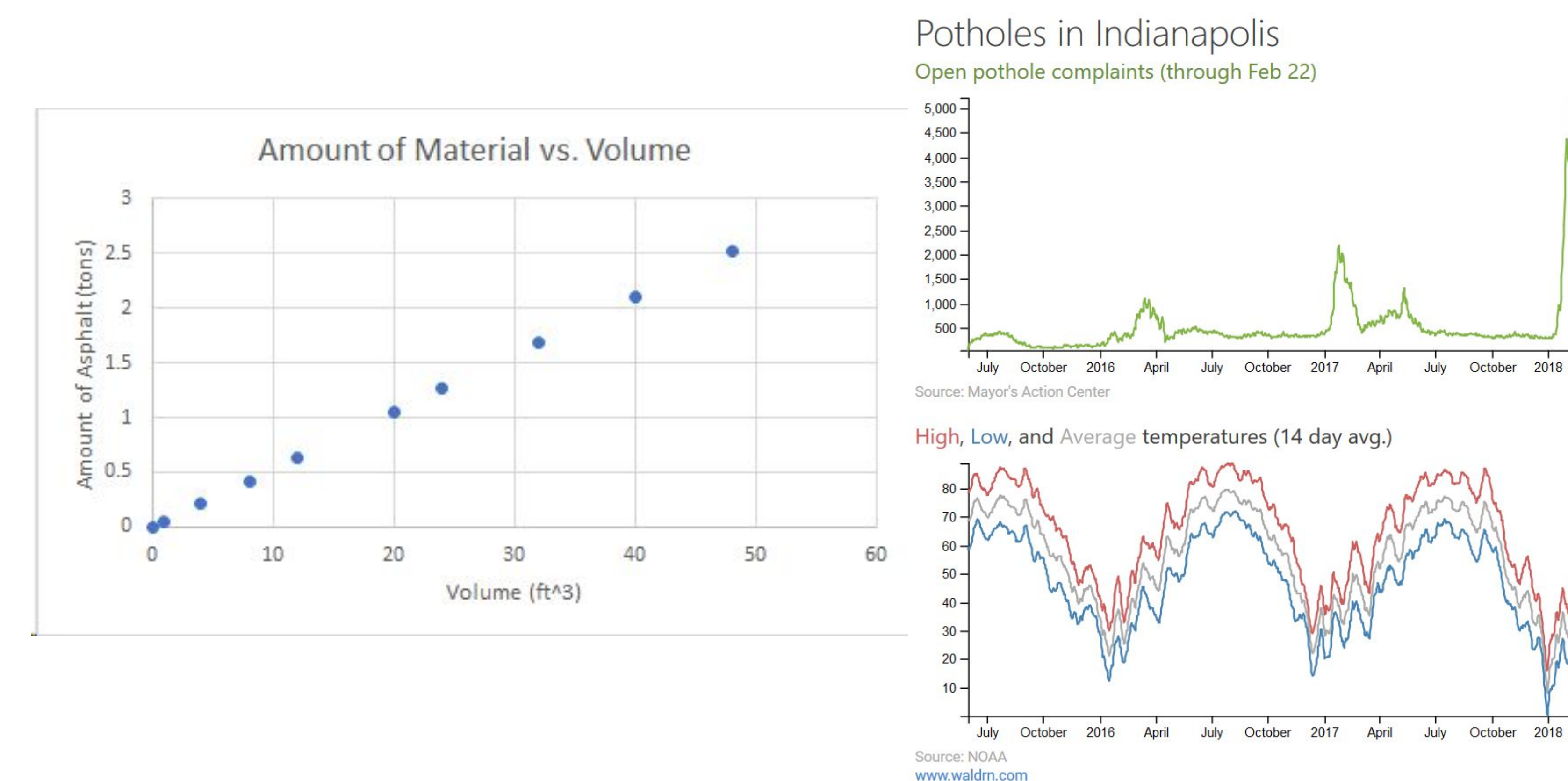
DOLLARS SPENT ON POTHOLE REPAIRS, based on \$32.00/pothole											
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	
January	\$21,696	\$68,256	\$22,976	\$26,784	\$23,936	\$24,352	\$44,992	\$81,440	\$17,952	\$41,792	
February	\$23,168	\$117,440	\$62,560	\$63,328	\$58,912	\$54,720	\$32,032	\$115,648	\$95,360	\$68,992	
March	\$38,592	\$166,528	\$47,648	\$97,728	\$85,536	\$75,904	\$57,440	\$132,896	\$72,768	\$85,824	
April	\$17,856	\$52,096	\$64,736	\$71,424	\$70,112	\$76,288	\$63,968	\$76,832	\$60,384	\$66,944	
May	\$18,784	\$53,856	\$39,968	\$44,480	\$66,464	\$53,024	\$51,048	\$69,472	\$70,656	\$58,688	
June		\$23,520	\$71,552	\$36,864	\$38,144	\$31,744	\$54,912	\$75,936	\$54,784	\$36,960	
July		\$20,672	\$33,952	\$33,280	\$23,872	\$24,768	\$25,600	\$45,632	\$39,072	\$42,464	
August		\$12,832	\$45,984	\$49,568	\$32,064	\$34,720	\$50,880	\$53,248	\$35,296	\$28,416	
September		\$8,960	\$38,304	\$50,368	\$61,952	\$29,920	\$35,104	\$44,416	\$48,896	\$43,776	
October		\$10,880	\$13,568	\$20,160	\$52,544	\$33,696	\$49,856	\$38,888	\$42,848	\$41,600	
November		\$14,528	\$9,728	\$24,576	\$18,464	\$15,008	\$57,312	\$20,032	\$42,304	\$18,816	
December		\$16,736	\$9,696	\$12,192	\$19,296	\$28,960	\$39,616	\$15,712	\$23,072	\$15,808	
Totals											average 2003-2011
Annual		\$506,304	\$460,672	\$530,752	\$551,296	\$483,104	\$563,360	\$769,952	\$603,392	\$550,080	\$564,324
Jan-May	\$120,096	\$458,176	\$237,888	\$303,744	\$304,960	\$284,288	\$250,080	\$476,288	\$317,120	\$322,240	\$328,309

Table 1. Pothole repair periods, materials, and methods in six provinces of Canada.

Province	Repair period (%)		Winter patching material (%)			Winter patching method (%)		
	Winter	Summer	CCM	HMA	QPR	IAR	Throw-and-go	Semi-permanent
AB	10	90	15	—	85	—	100	—
MB	10	90	—	—	50	50	100	—
ON	40	60	60	40	—	—	60	40
QB	43	57	75	25	—	—	80	20
SK	10	90	20	20	60	—	70	30
NB	10	90	—	5	95	—	95	5

Table 3. Sieve analysis results of granular aggregate for CCM, HMA, QPR, and IAR.

Sieve size (mm)	CCM		HMA		QPR		IAR	
	Percent passing	Sieve size (mm)	Percent passing	Sieve size (mm)	Percent passing	Sieve size (mm)	Percent passing	
12.50	100	16.00	100	100	9.50	100	9.50	100
5.00	60-80	12.50	97.4	4.75	20-85	4.75	20-100	20-100
0.16	9-14	10.00	89.1	2.36	2-30	2.36	1-60	1-60
0.08	4-7	5.00	55.4	1.18	0-10	1.18	0-50	0-50
		2.50	37.4	0.75	0-6	0.30	0-20	0-20
		1.25	29.4	0.08	0-2	0.08	0-5	0-5
		0.63	24.7					
		0.32	18.1					
		0.16	11.4					
		0.08	6.8					



CONCLUSIONS

According to the trends we found, we can say that potholes are becoming a major problem in Cleveland as well as other parts of the U.S. The charts and graphs we found appear to show that the issues of potholes are much larger than most people would think. However, by analyzing all of the important factors, we can come up with a more efficient method at tackling potholes in the most effective way possible.

FUTURE WORK

we can use this data collected to see first-hand where the major problems are and prioritize those. It is our job as engineers to determine which methods are the most effective, while also being the best value.

References

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