Hot Pavement Cool Solution

A two part 28 day study

By: Sullivan Steenburg

Trailside Elementary

Zionsville IN

Background

- **During the summer months, black asphalt can become very hot. I noticed this when my feet got red marks and felt burned while walking barefoot from the swimming pool across the asphalt to the garage to use the bathroom. This made walking uncomfortable for both me and my friends.**
- **I wanted to find a way to walk across the asphalt without wearing shoes and without getting burned. I wondered if painting a sidewalk shaped path across the asphalt would lower the surface temperature and make walking less painful on hot days. This question inspired me to create a science fair project to test whether paint color could help solve this problem. My hypothesis was that white paint would cool the pavement.**

Procedure

Part 1: Testing Paint Colors – Paint colors were selected that match our house

- **The asphalt was pressure washed to prepare it for paint and fresh sealant.**
- **Two 12 square grids were painted on a black asphalt driveway. Each square measured 6 x 6 inches and had unpainted asphalt in between as a control.**
- **The temperature of each square was measured three times a day for 14 days: Morning, Afternoon, Evening. This resulted in 1,008 temperature readings, which were averaged.**
- **Part 2: Testing the Best Color**
- **The paint color with the lowest temperature from Phase 1 was selected, which was white.**
- **A sidewalk-shaped path was painted across the asphalt using the white paint.**
- **The temperature of the painted path was measured once per day, during the hottest part of the day, for 14 days.**

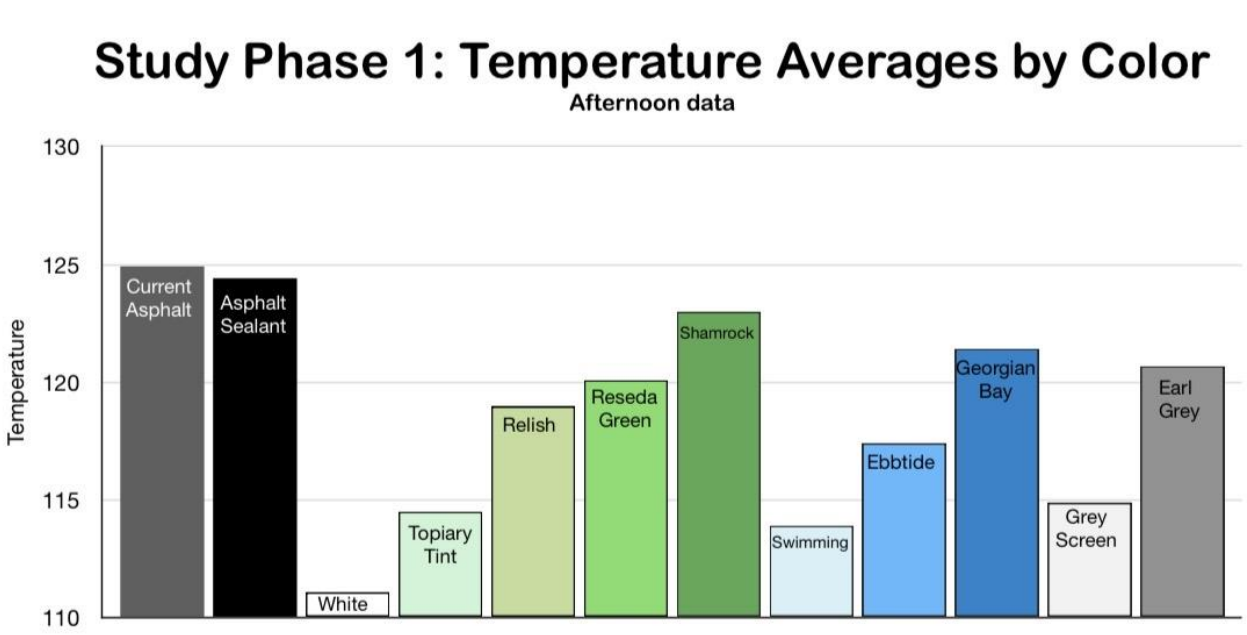
Photos

Part 1: Using paints that matched our house, I Painted two grids on drive. Tested two areas three times a day due to changing weather and shade.

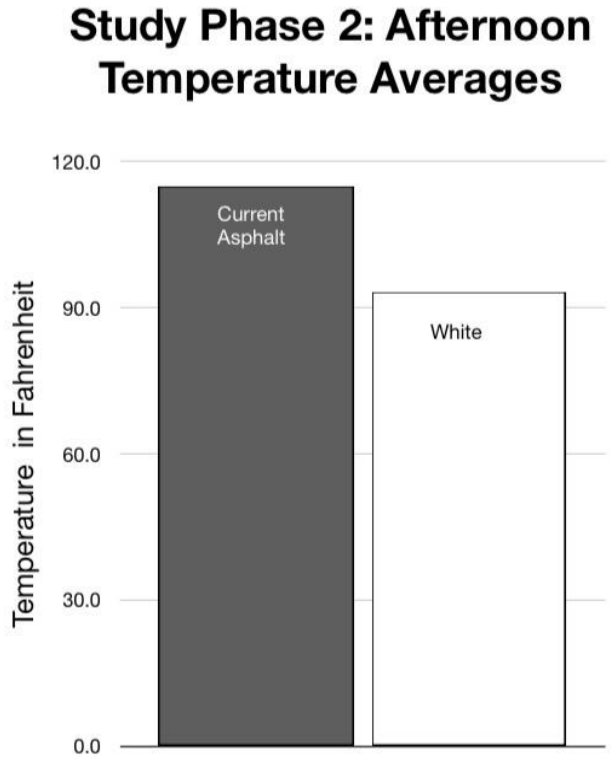
Part 1: Testing the temperature of the second grid with infrared thermometer

Part 2: testing the newly painted sidewalk.

Results



The white painted square had the largest cooling effect, reducing surface temperature by 13.8° F during the hottest part of the day. White was chosen for the sidewalk color for phase 2 of the study.



The white painted sidewalk lowered the surface temperature by 21.6° F.

Discussion

This was a two-part study. In the first phase, different paint colors were tested, and white paint was the most effective at lowering the surface temperature of asphalt. In the second phase, I painted a white sidewalk shaped path across the asphalt, which lowered the surface temperature by an average of 21.6°F making it more comfortable to walk on.

Temperature readings were affected by sunlight, clouds, and time of day. For this reason, measurements were taken three times a day at two locations over a 14-day period in the first phase. In the second phase, temperatures were measured once a day for 14 days.

After the study ended and temperatures dropped, another observation was made. Snow and ice melted quickly on the asphalt, but the white painted sidewalk stayed icy longer. This showed that while white paint helped cool hot asphalt in summer, it created a new safety concern in winter.

Data Reliability Analysis

To make sure my results were valid I used two different test areas, three times a day for 14 days to see how results changed with weather and environmental conditions. I learned the results were most reliable in the afternoon, the hottest part of the day. In the second part of my study, I only tested once a day for 14 days, in the hottest part of the day. By the end of my study I had collected 1,036 temperature measurements.

Results and Environmental impact

My data showed that my hypothesis was correct. The white paint was the coolest color. In both parts of my experiment, white paint had a lower temperature. In the first part, it was cooler by an average of 13.8˚F, and in the second, by 21.6˚F.

This project could help the Earth by making places cooler, if lighter colors were used, instead of black, on pavement. That could reduce heat, especially in cities. But I also found an unexpected finding. White paint didn't melt ice as fast, which could be a problem in cold places with snow and ice, causing the surface to be slippery longer.

If I were to repeat this project, I might expand upon it by testing the surprise finding of the ice not melting. I would try to test if the white paint really stops ice from melting, or if it keeps the asphalt from heating up enough during the daytime to stop the ice and snow from forming on it.

References

Vanderwest, S. (2025). Personal communication. Store Manager, Sherwin-Williams, Zionsville, Indiana.

Etekcity Infrared thermometer manual