



NATIONAL ASPHALT PAVMENT ASSOCIATION

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Mike Acott, President

To: Greenroads via email at info@greenroads.org
From: Howard Marks on behalf of National Asphalt Pavement Association
Date: November 30, 2011
Re: Greenroads Comments

On behalf of National Asphalt Pavement Association, we are providing an electronic copy of the following comments that we have attempted to submit on-line:

PT-4: Cool Pavement

The reliance on an absolute albedo of 0.3 (Solar Reflectance Index, SRI value of 30) to mitigate UHI is scientifically unfounded and appears arbitrary for the following reasons:

1) There is little, if any, credible or published evidence that the albedo or SRI of hardscape material is determinative of Urban Heat Island (UHI) effect. The majority of older research findings have merely looked at the impact of pavement albedo on pavement temperature. But the most recent findings from Stanford University, published late in 2011, show the uncertainty associated with this albedo mitigation strategy. Stanford found that increasing urban reflectivity, like white roofs, actually heats-up the atmosphere, increasing global warming http://www.eurekalert.org/pub_releases/2011-10/su-ui101811.php.

Similarly, other research institutions have questioned the validity of setting an absolute hardscape albedo value for UHI mitigation. In a recent letter to the California Assembly regarding their pavement reflectivity legislation (California Assembly Bill 296), Dr. John Harvey, Director, University of California Pavement Research Center, expressed his concern about this type of pavement reflectivity requirement. In fact, Dr. Harvey states that findings from his research, in collaboration with Lawrence Berkeley National Laboratories, have been misinterpreted. His electronic email and letter can be accessed here:

http://www.hotmix.org/index.php?option=com_content&task=view&id=686&Itemid=72 . Dr. Harvey's letter is public record and part of the Assembly Bill docket.

2) There are ancillary negative effects of imposing an absolute albedo of 0.3 that has not been considered. For example, the National Institutes of Health, Centers for Disease Control and Prevention (CDC) suggest refraining from using highly reflective hardscapes especially in school yards, in an effort to protect children from reflected UV radiation. CDC specifically recommends that: "Materials with a lower reflectance are more desirable." (CDC, p.6 http://www.cdc.gov/cancer/skin/pdf/shade_planning.pdf)

3) The proposed albedo / SRI index oversimplifies a very complex problem. A good overview on this can be found at <http://www.pwmag.com/industry-news.asp?sectionID=760&articleID=268116> .

More detail of each of these three points above can be accessed at http://www.hotmix.org/images/stories/napa_special_report_202_uhi.pdf .

Recently, FHWA recognized the uncertainty associated with a pavement's albedo to reduce UHI. FHWA's recent iteration of their Sustainable Highways Self-Evaluation Tool (INVEST) has removed all credit associated with UHI mitigation through cool pavements.

As the scientific community continues to look at ways to minimize carbon dioxide emissions, and reduce UHI, they increasingly find that pavement reflectivity or albedo has little to no impact on building cooling loads and subsequent UHI. Continuing to keep a hardscape albedo/SRI requirement is not only invalid, it appears arbitrary and raises the question of why it continues to be promoted. The albedo requirement should be stricken from PT-4.

PT-1: Long-Life Pavement

NAPA recommends the following changes to this section of Greenroads:

1. Change Hot Mix Asphalt Pavement to either Asphalt Pavement or Plant Mix Asphalt pavement. This may need to be changed in other sections as well.
2. PerRoad and PerRoadXpress should be added to the list of Design Procedure Methods. A write up to include in the manual may be as follows:
 - a. **PerRoad**, available from the Asphalt Pavement Alliance, uses the mechanistic-empirical design philosophy. The program couples layered elastic analysis with a statistical analysis procedure (Monte Carlo simulation) to estimate stresses and strains within a pavement.
 - b. **PerRoadXpress**, available from the Asphalt Pavement Alliance, is an easy-to-use, all-on-one-screen program for designing Perpetual Pavements for low- and medium-volume roads and parking lots.
3. On page 2 of the credit, paragraph immediately preceding "Documentation", NAPA recommends changing the last sentence in "Existing Pavement" to: . . . or an overlay of an existing HMA [add: or PCC] pavement. The justification is that rubblized, crack and seat, or break and seat PCC pavement with an asphalt pavement overlay can be designed as long life pavement.