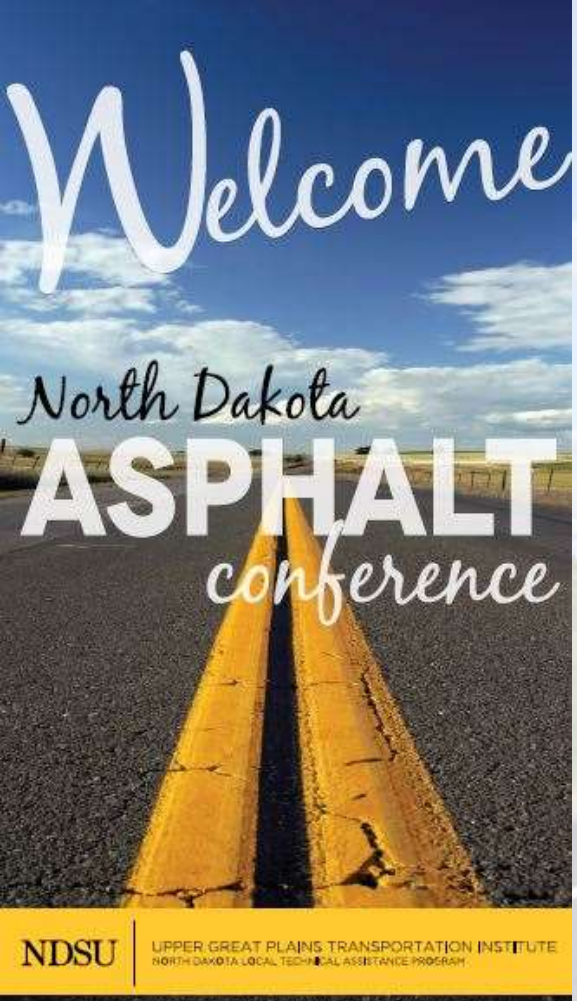

Innovation: The Key to Pavement Preservation

North Dakota Asphalt Conference

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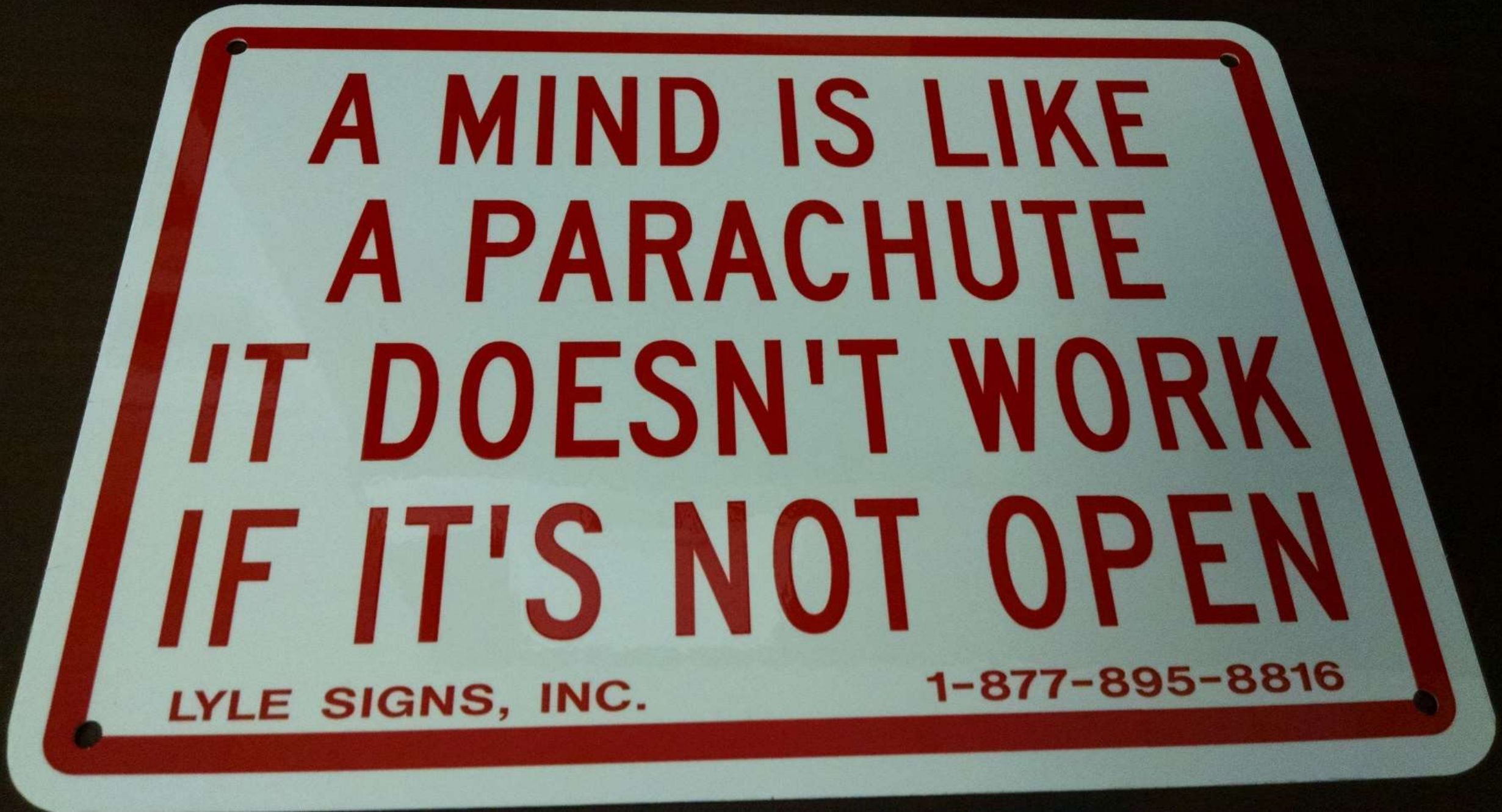
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ROAD READY R3 RESEARCH

JAN 2018 NO. 1

RESEARCH REVIEW: Crack Seal Best Practices

by Andrew Wrucke, NDLTAP Technical Expert

"Preventative maintenance is the key to wisely utilizing public dollars and building and maintaining an effective transportation system. This is particularly important for regions such as the Upper Great Plains and northern Rocky Mountains where "road miles" and "land area" far exceed population, weather and environment present a never ending series of cycles and challenges, and subgrades and base layers are many times composed of or contaminated by water and frost susceptible, fine grained soils. The first step in pavement preservation is crack sealing/crack filling as water is a constant, sometimes "unseen", but always ever present enemy of road performance. Effective and timely materials, methods and placement are the first step in this critical pavement preservation technique."

– Ken Swedeen, Dakota Asphalt Pavement Association (DAPA) Executive Director

Crack sealing in the field

Crack sealing/filling is a cost effective pavement maintenance tool that can be effectively completed by county workers or contractors. Knowing how to most effectively employ this technique is important, as failure of this product is costly, especially in low budget situations. This review includes some researched best practices from NDDOT, FHWA, and other sources. Crack sealing and crack filling are similar processes which prevent water infiltration into the pavement layers. Crack sealing is commonly referred to as a "route and seal" which can include routing out the cracks and is best for cracks that are considered "working." Crack filling is commonly just filling of existing cracks with sealant.

Routed crack being sealed

The ideal crack seal/fill creates a watertight seal over longitudinal and transverse cracks in the roadway. This prevents infiltration of water into the asphalt layer, base and subgrade, extending the life of the pavement. Cracks must be clean, dry and at least 1/8" wide to be candidates to be filled or sealed. Block and fatigue cracks are not good candidates to be sealed, as they are symptoms of pavement failure. Cracks wider than 1.5" will need to be evaluated for filling, as these are also symptoms of pavement failure. Thinner cracks may be routed to allow for a better seal placement. If a crack is routed, it should be routed to a minimum of 3/4" width to allow for a reservoir of sealant.

ROAD READY R3 RESEARCH

MAR 2018 NO. 2

PAVEMENT PRESERVATION TERMINOLOGY

Contributing Authors: Tom Wood and Sheue Torng Lee
WSB Pavement Specialists

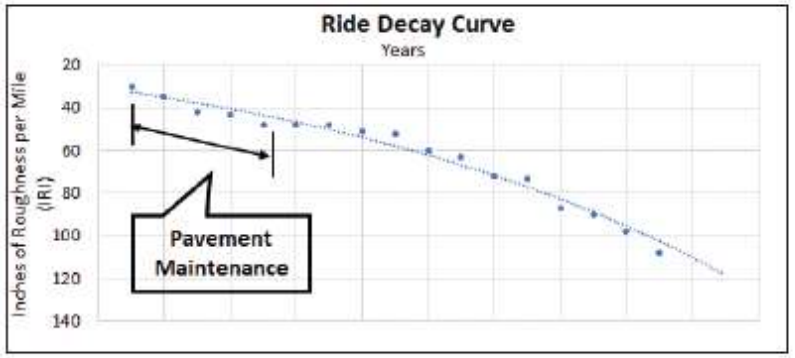
"Communication is critical for an agency to have a successful pavement preservation program. Often we assume that everyone we are working with understands the jargon we use. This document contains definitions for some of the treatments and measures used to establish a successful pavement preservation program. Clear communication and clearly defined terminology are keys to building a successful team."

– Dale C. Heglund, NDLTAP Program Director

International Roughness Index (IRI). A method to measure the ride quality of a roadway. Data is reported in inches of roughness per mile (in/mi). The higher the number, the rougher the roadway. New asphalt pavement should be in the 40 in/mi to 60 in/mi range. IRIs ranging from 96 in/mi to 170 in/mi indicate an "average" asphalt ride and anything over 170 in/mi indicates a poor asphalt ride. A smooth gravel roadway has an IRI of approximately 200 in/mi.

Pavement Management. A systematic measurement of the elements of pavement condition used to evaluate the performance of the pavement. The data are used for project planning and budgeting. This data allows the owner to determine the health of their system.

Pavement Preservation. A system of treatments with the goal of delaying reconstruction as long as possible.



Preventive Maintenance. An activity performed on a pavement to delay or prevent aging of the pavement. Preventive maintenance is analogous to an "oil change" for your roadway. This effort needs to start as soon as the roadway is paved.

Moderate Cost/Moderate Impact Preservation


Sand Seal
http://rahabitumen.com/bitmen-emulsion-sand-seal/

Sand Seal. A heavy fog seal in which the cover aggregate is clean sand or screenings. The cover aggregate reduces the chance of having low-friction characteristics.

Chip Seal. A surface treatment constructed by placing a heavy asphalt membrane over the roadway surface followed by a single layer of aggregate normally called a chip. Chip seals are used to protect the underlying pavement from environmental damage and can increase friction characteristics.

Double Chip Seal. A double chip seal is a combination of two layers of chip seal applied during the same construction season. The bottom layer chip is typically about twice as big as the top layer chip. Double chip seals are used on pavements with a large number of cracks.


Scrub Seal

Scrub Seal. A modified chip seal where a special rejuvenating asphalt emulsion is sprayed on the surface. The rejuvenating emulsion is then scrubbed into the cracks by brooms pulled behind the asphalt distributor. This process is then followed by an application of cover aggregate that is similar to a chip seal. Scrub seals are used on pavements with a large number of cracks and serve the same purpose as double chip seal.


Micro Surfacing

Slurry Seal. A mixture of high-quality crushed aggregates, special asphalt emulsion, mineral filler, and water. It is mixed at room temperature and air dries from the top to the bottom. Slurry seals are used as a surface treatment only. The process was developed in the 1920s.

Micro Surfacing. A second generation of slurries. It also uses a mixture of high-quality crushed aggregates, a special polymer-modified asphalt emulsion, mineral filler, and water. There are two differences between micro surfacing slurry seals: 1) Micro surfacing is a chemical cure that forces the water out from the bottom to the top. This allows the micro surfacing to be placed in thicker lifts. 2) In micro surfacing, the asphalt emulsion is always polymer modified. It was developed in the 1970s for rut filling. Micro surfacing can be used to restore cross slope, improve friction, and protect the surface from environmental aging.


Micro Milling

Cape Seal. A combination of a chip seal followed by a layer of slurry seal or micro surfacing. This process was originally developed to allow chip sealing on high-volume high-speed roadways. The idea was that the slurry locked down the chips of the chip seal, reducing the risk of vehicle damage. Cape seals area now most commonly used on pavements that have numerous cracks and some rutting or cross slope issues. The chip seal does an excellent job of sealing the cracks and the micro surfacing does an excellent job of filling the ruts and fixing cross slope issues.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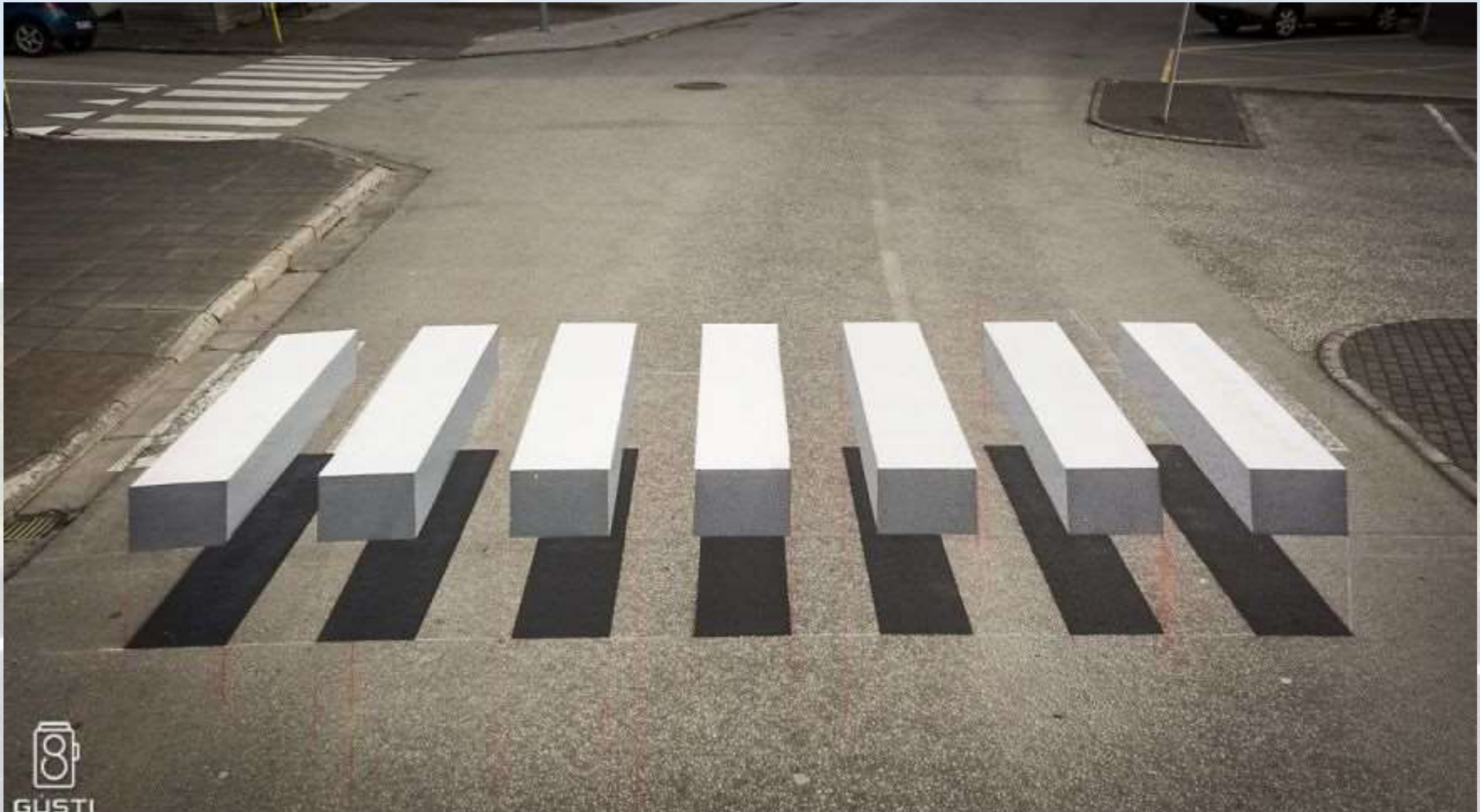


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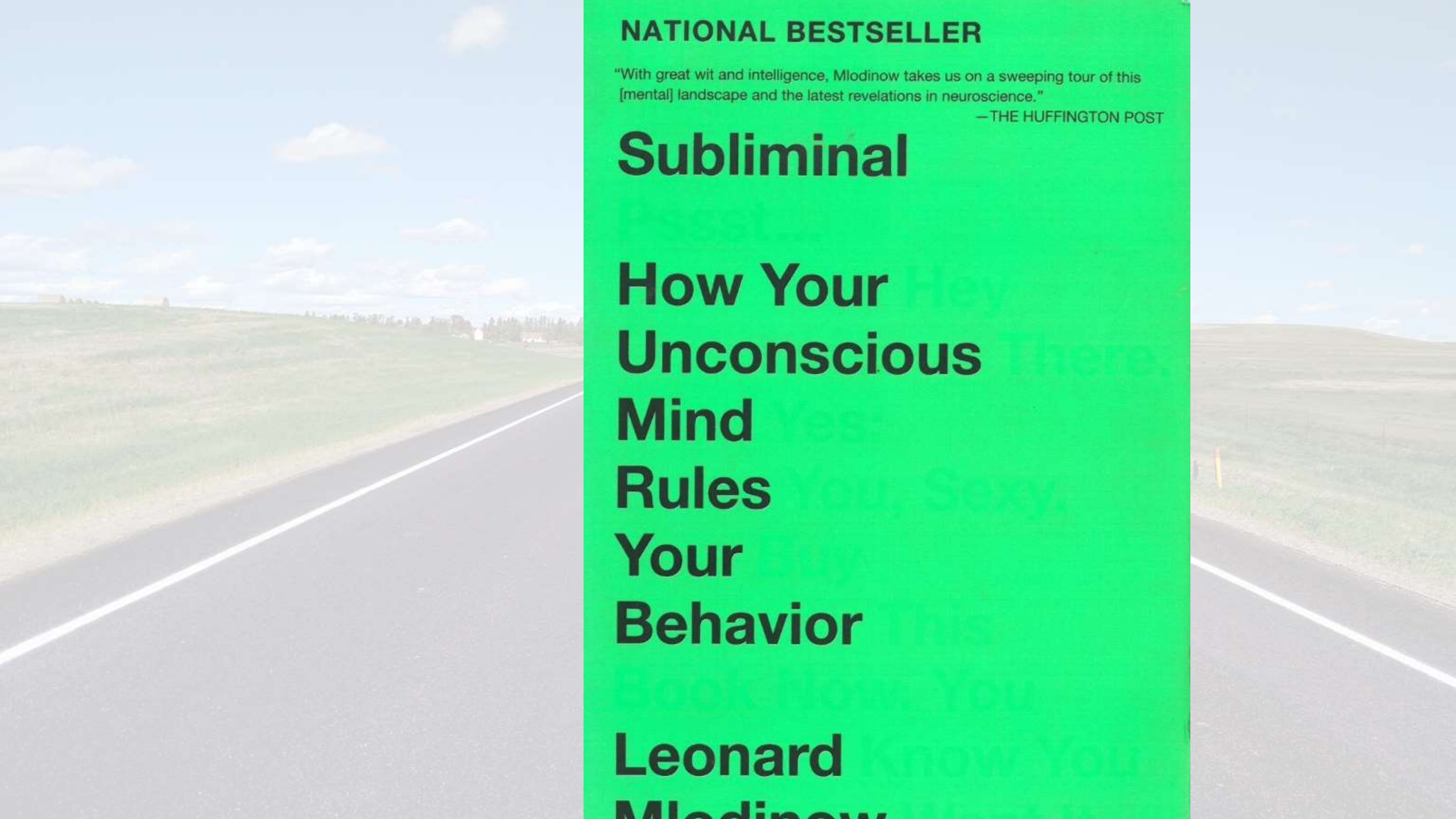

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Photo Credit: Justin Hyndman, PE, KLJ

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