

#BuzzOnAsphalt
 Improving the Performance of
 Open-Graded Friction Course (OGFC)
 Surface Mixes

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What asphalt pavement questions can I answer for you?

I've been trained on hundreds of NAPA publications and have broad general knowledge of asphalt pavement topics. Ask me anything that you'd like and I'll do my best to provide a concise answer and point you to additional resources.

What are the keys to excellent OGFC performance?



www.HeyNAPA.com

- Excellent performance of Open-Graded Friction Courses (OGFC) is achieved through a combination of good design practices, proper material selection, and meticulous construction techniques. Here are the key factors that contribute to the successful performance of OGFC:
 - Material selection – polymer, coarse stone-on-stone, fibers
 - Mix design – high air voids, optimum binder, low Cantabro loss
 - Construction practices – temperature, compaction, tack coat
 - Maintenance – debris/contaminant free, fog seal preservation
 - Environment – local climate, freeze/thaw cycles, stripping/raveling
 - Traffic – medium and high traffic success, design accordingly

#BuzzOnAsphalt Keys to Pavement Performance

- Mix/materials – meeting specific needs of each layer
- Thickness design – preventing non-surface cracking
- Preservation – safe, durable, renewable surface.

<https://www.asphaltmagazine.com/what-is-happening-with-our-ogfcs/>

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- Material selection
- Mix design
- Construction
- Preservation.

WHAT IS HAPPENING

Four areas of focus for longer lasting open-graded asphalt mix design techniques

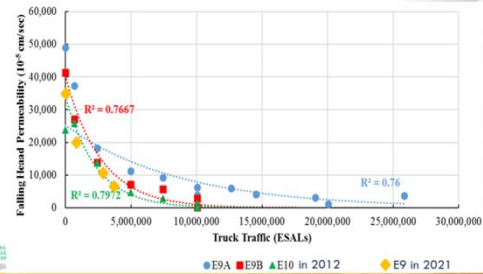
Four areas of focus

Background

- Decreasing in-place air voids extends the life of dense graded asphalt
- OGFC asphalt has intentionally high air voids₁₅₋₂₅ to remove water
- Raveling begins at 3 years, roughness at 5 years, “failure” in 6-12 years
- One hard winter can remind us that we don’t have it figured out
- Life span of OGFC asphalt can be half of other high traffic surfaces
- ~70 percent reduction in wet weather fatalities has been reported
- Agencies still place OGFC because of proven safety improvement
- Four steps to improve the durability of OGFC asphalt pavements.



Mix Design



Material Selection

- Aggregates that exhibit long-term high microtexture (i.e., good “skid”)
- Some high macrotexture aggregates are also absorptive (stripping)
- Design blends utilizing enough stockpiles to facilitate control
- Specify binders with reduced physical and chemical aging properties
- Age resistant asphalt binders (e.g., polymer and high polymer)
- Means to prevent binder draindown and improve durability
- Mineral, cellulose, or “super” fibers for film thickness (aramid, GTR,...)
- Warm mix additive (WMA) and reduced mix temp for effective binder.



Construction

- Mill to avoid scabbing, thin leveling with small NMAS mix if necessary
- Ensure clean, dry milled surface prior to application of tack
- Tack products and rates between OGFC and underlying layer
- Best practices at transverse joints to prevent thin mat raveling
- Producing mix at lower temperatures using both WMA and fibers
- Cooling rate of the newly placed thin and open graded mat
- Cleanup with solvents at the end of the (oftentimes night) work shift
- Startup waste load run through paving train for preheat and residue.

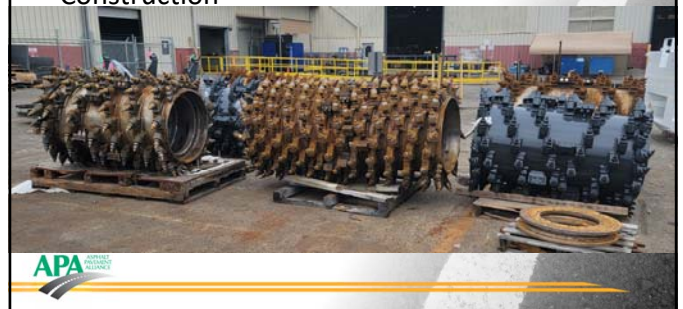


Mix Design

- More macrotexture with higher NMAS, permeability with lower
- Voids in coarse aggregate of the mix cannot exceed dry rodded voids
- Design air voids at the lower end of the design range (fines)
- Slower binder aging with greater film thicknesses (fibers)
- Notion that thick film coating makes antistrips unnecessary
- Cantabro mass loss measurement to ensure mix durability
- Critical aging lose mix at 275F for 4 hours prior to Cantabro testing
- Enough binder for **durability** but not enough for **draindown** (“BMD”).

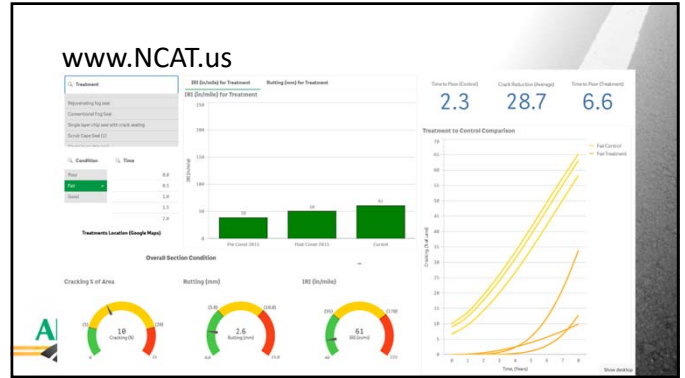


Construction



Preservation

- We don't ignore the roof on our houses until structure is leaking
- Preservation is necessary to achieve lowest possible life cycle cost
- Especially true for OGFC that lives with wet, high traffic, rapid aging
- Rejuvenating fog seals timed for application before raveling begins
- Low application rates to not fill voids, safe early post treatment friction
- Safe friction is essential when the treated roadway is open to traffic
- Asphalt and "green" based options for binder property restoration
- Solvent based, water based, sanded, polymerized, dual spray bars...



Preservation



Takeaways

- Agencies want to use OGFC, but it must be affordable (life cycle)
- Winter events in ~5-year intervals remind us we have to do better
- Quality materials, mix design, construction effort, preservation
- Sustained microtexture aggregates, 3 or more bins, WMA, fibers
- Smaller NMAS, (high) polymers, film thickness, BMD, antistripping
- Milling, cleaning, tacking, transverse joints, temp, cleanup/startup
- Don't ignore the "roof," timed intervention, skid, functional voids
- Safe and sustainable pavement at the lowest possible life cycle cost!



www.NCAT.us

The screenshot shows the NCAT website's 'Pavement Preservation Webinars' section. It features a navigation menu and a list of webinar recordings, including 'CRACK SEAL' and 'FOG SEAL' from the 'PG Study Findings Webinar Series'.

Questions?

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