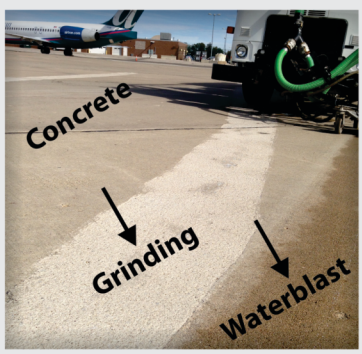
RESPECT THE PAVEMENT

Performance HydroBLASTING

Analysis of Current Specification

Marking Removal can look better than it is currently looking in the work zones and after the work zones have concluded. To this end the removal community needs the removal community needs the Owners to provide or adopt two more written specifications. One for the ***Blasters*** and one for the ***Grinders***.

Currently both methods are combined under a single spec which shares terms across both disciplines but in doing so cancels or weakens the meaning of those terms.



Two levels of quality need set for ***each*** method of removal. One low generic spec level already exists as the current spec but needs interpreted to grinding, and it needs interpreted to blasting under a blasting spec. And while a higher spec is needed a low quality level or generic spec remains highly valuable for a large segment of work in both genres of removal. Some scenarios need cheap and fast and may be acceptable under the generic spec. But certain areas need and can have a higher result via higher spec.

For Blasting, whether by water, steel shot, or sand, the tolerance for damage needs to be defined in the measured distance between the top of the pavement's aggregate to the top of the binder as compared to virgin surrounding pavement.

For grinding, the reference to scarring needs reworked as a grinder always scars because it shaves the surface off the rocks. Also, grinding specs need defined by type of teeth or sawblades.

Disclaimer: References to low quality spec or poor spec are not slurs against specifiers! These terms refer to the current results of the combined spec.

Analysis of Current Specification

Many of the industry's current guidelines were written for multi-purpose applications.

A current DOT spec sample:

G. Conflicting Markings. Conflicting markings are considered to be any markings not actively in use, not behind channelizing devices or portable barrier and/or could be misinterpreted by the traveling public or cause confusion to the driver as determined by the engineer. Before placing work zone markings, remove or cover all conflicting existing markings visible to the traveling public.

1. **Removal and Covering of Markings.**

   a. Removal Methods. Remove the markings to that less than 5% of the line remains visible. Repair damage to the pavement that results in the removal of more than 1/8 inch of pavement thickness.

   Use sand, shot, or water blasting to remove markings on all asphalt or concrete pavement surfaces.

   A Grinder may only be used to remove markings on temporary pavement that will be covered or removed prior to project completion (e.g., intermediate asphalt course). When a grinder drum is mounted to a skid steer loader, the drum must be able to accommodate a minimum of 150 teeth.

   641.10 Removal of Pavement Markings. If specified as a pay item, remove pavement markings as described in 614.11.G. Take care during marking removal not to scar, discolor, or otherwise damage the pavement surface. Do not over paint or use other methods or covering markings instead of removal.

   D. Removal of Existing Markings. When placing epoxy markings in the same place as existing pavement markings, remove at least 95 percent of the existing pavement markings. Use a removal method that results in little or no color and texture changes in the surrounding pavement.

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For Removal of Pavement Markings by UHP (Ultra-High-Pressure) Water Blasting.

(This article is targeted to Asphalt because most roads are asphalt and because most dissatisfaction occurs on asphalt. Concrete deserves its own version of this escalated spec though, because many bridges are currently being scarred by grinders and by water blasters due to the current single spec system. It's unnecessary because concrete is so durable it should respond very well.

The Current Written Spec for removal is self destructive on each key point of the spec. The key words are not defined, and the spec combines two drastically different process under a single standard. This has established ambiguities in the industry which do violence to each other. By the end of reading one realizes we really have no spec, and none that is readily enforceable. (Full deference given to the specifiers who adopted a spec to get water blasting to the end uses when it first comes out.)

Some states' DOT Specification sets 1/8" of pavement thickness removed as the trigger or threshold for requiring repairs. That might seem strict but strict in an ineffective way, but 1/8" of removal depth creates permanently conflicting ghost lines.

This is a reasonable concept but one which lacks definition. There is a misnomer implied due to the pavement being a mix of hard and soft elements as well as large and small elements. A layman's application of the word "surface" would seem to refer to the upper most element of the pavement. This would be the top of the upper strata of aggregate. This spec lends itself more to regulating a grinder depth because a grinder does grind aggregate down to the lowest contact point of the grinding teeth. However, this spec is difficult to apply to a water blaster because the water blaster truly does not reduce the height of the aggregate surface. It *does* remove some of the fine asphalt binders and smaller sandlike aggregates among and between the larger aggregates, but in doing so it does not *reduce the pavement thickness.*

Where the spec mentions to take care not to *scar*...or... *damage*...or *discolor* the *pavement surface*, the five key terms selected create conflicts of those terms which nullify most of the written specification.

For example, *pavement* is one of the key words of the spec. Yet, *pavement* can be defined more in detail. Likewise the word *Surface* also consists of distinct and separate elements which affect the finished appearance.

Analysis of Current Specification

There are two basic methods of removal which each deserve an exclusive written spec. These two methods affect the pavement uniquely. ***Grinding*** removes some pavement thickness and cuts and polishes the aggregate leaving ruts in the surface and **discolored** stone. While **discolor** is prohibited, 1/8" decrease is allowed by the tolerance before repairing is required (**discolor** allowed).

Whereas ***blasting*** does not cut any aggregates or make ruts, it *does* remove some binders and fines in between the aggregates. The more fines and binders are removed, the more shadows are cast in the pavement texture, and the shadows create an appearance of conflicting lines. However, deep shadows themselves to do not violate the current written spec.

With much study one can see that the terms are strained due to the two basic processes of removal. ***Blasting*** by either sand, water, or steel shot, is one genre' of marking removal process. ***Grinding*** is the other and also has sub categories such as PCB teeth, sawblade teeth, and milling machines which should be named in the new grindings spec and given unique guidlines for both types of grinding. (PCB vs sawblades)

A current allowance of up to 1/8" of removal thickness is effectively licensure for a grinder to actually shave the aggregate and the binder up to 1/8" overall depth. The result is the aggregates center materials are exposed and polished, usually creating a white scar. The deficiency in the spec renders the scarring guideline a moot point except where a scar is deeper than 1/8". So while the spec prohibits scarring, the allowance for a grinder to grind 1/8" deep cancels the non-scarring spec. It also allows grinders to compete on basis of "scarring assumed." (a Silent but implicit spec)

To compound the problem, lowest bid being the deciding factor, ***blasters*** are unable to compete or to deliver their *best-of-kind* and are forced to run competitive energies to keep production up and price down. Even so, inspectors typically hold blasters to a higher removal % standard than the grinders because they know blasting can extract deep paint from the surface without removing 1/8" of aggregate. This is an unfair policy and is a disincentive to finer energy profiles.

The current spec, though low quality could possibly be redefined to retain the ability to perform cost effective removals where lowest cost is needed.

A new higher tier spec should be added for those sections of pavement where the finest finish is the more important need.

Analysis of Current Specification

The current written spec is not geared to water blasting, as the surface is not reduced by any measurable thickness because a water blaster will not reduce the thickness of an aggregate or a piece of rock.

A water blaster *can* and often *will* (usually, in varying and articulable degrees), remove *some* binders in between the surface aggregates. However, in removing surface binder materials and fine materials they can effectively erode up to 2/3 the thickness of the fines (or more) without reducing the pavement thickness. That amount of binder removal will certainly cause deeper shadows which some might call a "scar", (the word *scar* has been voided elsewhere in the spec.) The term *discoloration* could potentially be brought to bear in such a case, except that the water blaster does not alter the color of the aggregate. And since the aggregate comprises the *surface*, and the grinder is allowed to scar it to 1/8" deep, (which discolors it) then the word *discoloration* is voided by the rest of the spec. Fortunately the spec implies three other specific limits which seem to ban the appearance of a conflicting ghost line. These three limitations are 1. Otherwise 2. Damage 3. Discolor Yet, even these are strained for interpretation.

We already dealt with *one aspect* of discolor that doesn't fit, in that grinders are allowed to expose the center, and polish the rock (aggregate) to 1/8" overall depth, thought it does not mention a word "overall" or any other word for limiting depth such as "average" or "nominal" or "mean" or "terminal". *Depth* itself is not used either but rather *thickness* is the operative word offered. The remaining two aspects of ***discolor*** happen to be the key items which cause dissatisfaction with the water blasting process. The first of these remaining two aspects of *discolor* is easily dismissed as irrelevant because it is merely the restoration of the pavement to its original new color, prior to oxidization from UV rays. This blackness occurs even with the most perfect removal with zero impacts to the pavement. This is because the paint that was removed had always protected the pavement from the UV rays. The color of the AC pavement is always very black when brand new. With the Paint removed, the pavement is presented in its original brand new condition. The water blasting did not discolor the pavement and cause this, but rather the water blasting only perfectly cleaned the paint away and left the pavement show up. Now that we have eliminated two of the available applications of **discolor**, let's look at the final implied *discolor* as granted by the use of the term ***otherwise***.

Analysis of Current Specification

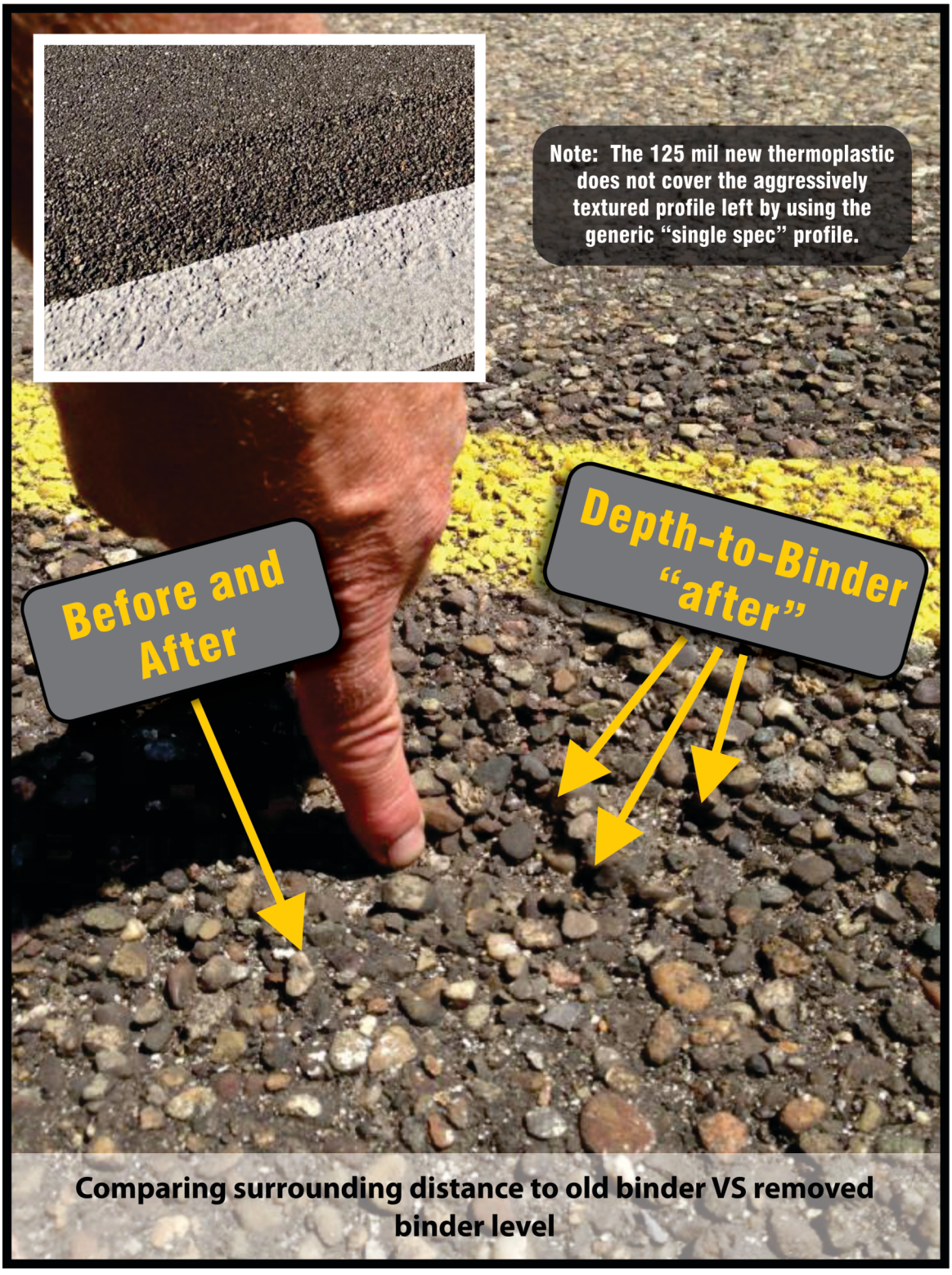
A Case of drastically misapplied energy on concrete

RESPECT THE PAVEMENT

Performance HydroBLASTING

Re-define "Damage" as:

"The increased vertical binder depth in excess of established tolerance."



Comparing surrounding distance to old binder VS removed binder level