Pay Me Now, or Pay Me More Later

A review of the road situation in Avocado Estates by the Board of Directors – April, 2012

Background

As we are sure you have noticed, the street condition in our neighborhood continues to degrade. The streets, curbs and cul-de-sacs are riddled with cracks and more recently pot holes. Deterioration of asphalt paving is a normal occurrence of time and, unfortunately, there is no reversing the process. If you have not noticed the condition of the streets, do not just drive over them, but rather go out and walk them for a few hundred feet.

Regrettably, the association boards and/or the management companies from our community's early history apparently did not have a good understanding of the slow ageing process and failed to enact a dues structure that would have better provided for this eventuality. It is an easy thing to do while the roads are still in reasonably good condition. Prior to the last few years, proactive regular maintenance was also neglected, which hastened the deterioration.

Recent association boards have begun to provide leadership and have acted to mitigate the situation. Slurry seals and some spot repairs have been done in an effort to try and stay ahead of the deterioration. Sadly though, once the large, deep cracks begin to appear in the asphalt, it is very difficult, if not impossible, to gain proper, long-lasting repair by sealing or spot patching. Once any cracks appear, water is allowed to get under the paving, further under-mining the asphalt and accelerating its failure.

The paving is now at the point that any further attempt at spot repairs or sealing will be largely a wasted effort. The time has come to deal with the situation - otherwise, we will be just spinning our collective wheels and wasting our time, and most importantly, our money. Money in the form of effective repair dollars, as well as the decreasing property values we will face as the roads continue to deteriorate.

The degrading surfaces will ultimately fail completely. But well before that, they will certainly affect the value of our homes and our lifestyle.

Options

Various options exist in regards to degrading asphalt. The intent of this bulletin is to help everyone understand just what those options are.

We really must deal with the situation in the best way possible. The Avocado Estates Board hopes to foster a strong, unified community spirit to finally get on top of this situation and come to the best value based, long-term resolution. The current members are committed to that purpose.

We could continue to simply seal and patch over the existing surfaces…

Sealing applies a thin coating of emulsion over the existing surfaces and has been done already a couple of times in recent years. This treatment *looks* pretty good after it is done and is able to seal some of the smaller hairline-type cracks, but it is not really a repair option for the larger cracks. Sealing is typically considered preventative maintenance and needs to be done every 2-3 years on any asphalt service to prolong its life and wear ability. We did such a treatment last year for a cost of $22,000.

Though effective on some areas of our roads, the bulk of them are past the point where further such sealing is preventing anything – it may look good for a short period of time, but if you go out and walk the streets around your home you will see that these sealed areas are full of new cracks. So, this is not really an option.

The next thing to consider would be to continue to try to do ongoing **spot patching** to the existing surfaces. We have also done this fairly recently. This process places an additional layer of asphalt over the defective area. This process is truly a patch and will not achieve any sort of long term solution because it does not treat the fundamental problem of the cracking, but rather acts as a band-aid to cover the problem.

Again, all you have to do is go out on the street near you and observe some of the patching that has occurred previously – what are called ***reflective cracks*** appear very soon (weeks) after such "capping" is done since nothing is actually done to mend the actual cracks or any underlying base material.

Ultimately, over time as the asphalt reaches its normal life span, the infamous **potholes** will begin to form and they of course require even greater repair. If we were to implement such a patch program, another round throughout the community roads is in the neighborhood of $250,000-$300,000…and this would only treat partial areas, leaving the others to soon reach the same point of disrepair.

FDR. A relatively new asphalt repair process, called pulverization or FDR (full-depth reclamation), actually grinds up the existing asphalt, often combining it with another substrate such as lime or cement. This ground/mixed material is then spread to use as a **base** for a brand **new layer** of asphalt. Our existing roads were not built with such a base and this is part of the reason for their current state.

In addition to being a *very* effective, actual repair, this is considered a "green" solution since it usually fully recycles the existing materials and eliminates the need to haul all the old materials away to the dump. According to estimates we have received to perform such a process on all of our roads, curbs and common parking areas (but excluding individual driveway areas) would run about $800,000.

The expected life of this type of repair is **20 to 30 years**, assuming regular preventative maintenance and sealing (which we will be budgeted for in the future annual HOA expenditures) is done every 2-3 years. Attached is an industry white paper, which more fully describes the FDR process.

Another option is to completely **remove all the existing asphalt** and start over again with new base material **and newly pave** the streets and curbs with asphalt. This level of repair is estimated to require an expenditure of upwards of $1,500,000. The expected life of such a repair, again assuming regular

maintenance, is **25-35 years** because the new base material that would be provided would be better than the pulverization-created base material created under the FDR process.

One more option would be to remove all the existing asphalt material and replace it with **concrete**. Such an approach would cost in the neighborhood of $2,500,000. The expected life of this option is **indefinite**, but repairs such as might be needed to repair a utility line might be more costly with concrete paving as opposed to asphalt.

Recommendation

The condition of the roads grows worse each passing month. The time has come that we face and resolve our situation. It is most likely that the cost of putting things off will continue to escalate, and, our property values and daily lifestyle will erode along with the streets.

The current board realizes that we need to do the necessary work to actually fix things now, rather than continue to try to eek by and do ineffective, senseless patching – surely only a short-term solution.

The board recommends implementing the FDR method as the most cost effective, best value, long term solution considering our situation. It provides the greatest value when considering the dollars expended versus the expected useable life.

Typical before and after when employing proper FDR road repair…

Additionally, once an effective long term repair is implemented, the board will properly adjust the ongoing association dues allocations to provide regular preventative maintenance, as well as anticipate and allocate for the inevitable major repair/replacement that will be needed down the road so that we and future homeowners will not be faced with the major one-time expenditude that we are now facing.

Financial Considerations

There are two categories of funding for the roads as a part of our monthly homeowners fees, one is for road maintenance and one is for road replacement costs. Neither of these two items had been appropriately addressed until more recently – the association had not allowed for sufficient regular maintenance of the existing roads. Nor had we placed enough into the reserve accounts to cover the proper eventual major repair/replacement that we now face.

Over the past couple of years, the board has shown a great deal of leadership and increased our monthly dues to try and get our operating expenses and reserves into proper fiscal shape – a good deal of progress has been made, but due to the short time frame other items in need of significant repair like the pool area, we still lack the necessary reserve funds to properly repair/replace our roads.

One avenue to explore would be to take out an HOA **loan** in an amount sufficient to do the FDR repair, which is approximately $800,000, or approximately $8,000 per household.

Such a loan could be constructed with various terms, the interest rate increasing the longer the term used to pay off the loan amount. For example, paying off such a loan over 5 years at 6% interest would amount to around $155 per month per household. Longer terms would result in smaller monthly payments, e.g., 10 years at 6% would cost around $90/mo., though obviously paying over a longer period of time would incur significantly more in interest charges.

Under such a loan, nothing would preclude any homeowner from paying off their portion in one lump sum and avoiding any interest.

Another idea that has been suggested would be to look into **selling off** some of the **common area** land for additional housing development. Such an approach would require some zoning changes in order to happen, but if it were to happen, it could offer the opportunity in time to reduce the amount we would need to re-pay on the loan.

We have looked into the process superficially at this point and determined there is no certainty that that the county would be willing to allow such changes, and even if they did, the process of change and development would not happen in a timeframe sufficient to help with the initial outlay required for the project, but rather eventually reducing the amount of the loan.

Recap

Hopefully this review of our streets helps to explain to you our current situation, offers some insight into the magnitude of the problem we collectively face, and presents an effective proposal for its long-term resolution.

The board will schedule a special meeting of the homeowners to discuss all these things in an open forum and solicit any and all opinions and/or suggestions that you may have so that we can all come together as a community and best provide for our future.

Best regards,

The Avocado Estates HOA Board

Full-Depth Reclamation: Recycling Roads Saves Money and Natural Resources

What is Full-Depth Reclamation with Cement?

Full-depth reclamation (FDR) recycles the materials from deteriorated asphalt pavement, and, with the addition of cement, creates a new stabilized base.

A surface consisting of a thin bituminous chip seal, hot-mix asphalt, or concrete completes the rebuilt road. The recycled base will be stronger, more uniform, and more moisture resistant than the original base, resulting in a long, low-maintenance life. And most important, recycling costs are normally 25% to 50% less than removal and replacement of the old pavement.

Recycling Pavements

Deteriorating roads are a constant problem for cities and counties. That's why engineers and public works officials are turning to a process called full-depth reclamation (FDR) with cement. This process rebuilds worn out asphalt pavements by recycling the existing roadway. The old asphalt and base materials are pulverized, mixed with cement and water, and compacted to produce a strong, durable base for either an asphalt or concrete surface. FDR uses the old asphalt and base material for the new roadway base. There's no need to haul in aggregate or haul out old material for disposal. Truck traffic is greatly reduced, and there is little or no waste.

Material Conservation: A Wise Choice

FDR with cement conserves virgin construction materials and makes smart economic and strategic sense. A century of modern growth and urbanization in America has depleted once plentiful aggregate supplies. Frequently, aggregates either come from distant quarries at great expense or from local sources offering only marginal quality.

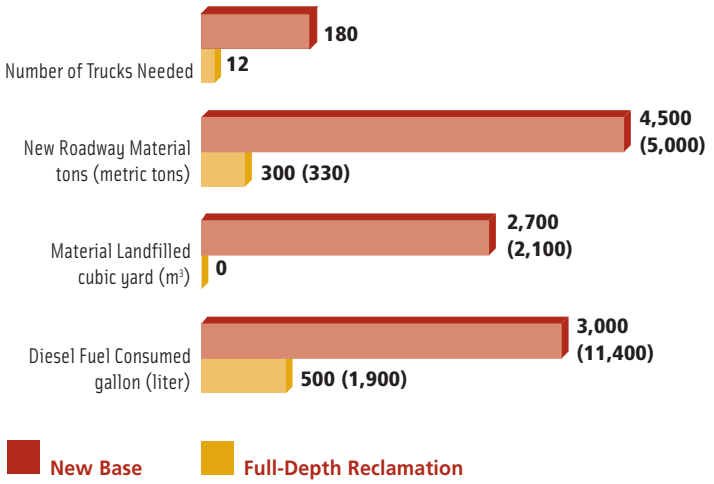
Continuing to exhaust these valuable resources to rebuild existing roads only propagates and accelerates the problem. Additionally, if old asphalt and base materials are not recycled, they must be disposed of or stockpiled, increasing transportation costs and utilizing valuable landfill space. In some locales, old asphalt can no longer be landfilled. Environmental laws are becoming stricter, thus adding to the expense of mining new materials and landfilling old.

Recycle, Rebuild

FDR with cement makes the reconstruction of old roads a largely self-sustaining process. The original "investment" in virgin road materials becomes a one-time cost, which is reclaimed through cement stabilization and addition of a new, thin surface course.

Energy Use and Materials

Full-Depth Reclamation vs. New Base



Based on 1 mile (1.6 km) of 24-foot (7.3-m)-wide 2-lane road, 6-inch (150-mm) base

PCA
Portland Cement Association

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Design and Construction: Simple and Fast

The basic procedure is simple. The complete recycling process can be finished in one day, and traffic can be maintained throughout construction. The procedure includes the following steps:

Site Investigation: The site should be investigated to determine the cause of failure. Core samples or test holes should be used to determine layer thicknesses and to obtain samples of the material to be recycled. Material sampling should include the asphalt surface, base course aggregate, and subgrade soil.

Thickness Design: Pavement thickness can be determined by using PCA's *Thickness Design for Soil-Cement Pavements* (EB068). Other methods, such as the American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures can also be used.

Laboratory Evaluation: Material samples from the site should be pulverized in the laboratory to create an aggregate-soil mix that will be similar to that expected from the reclamation process. The mix design procedure is the same as that performed for soil-cement. (Refer to PCA publication EB052 *Soil-Cement Laboratory Handbook.)* This includes the determination of maximum dry density and optimum moisture content. If unconfined compressive strength is used to determine cement content, a 7-day strength of 300 to 400 psi (2.1 to 2.8 MPa) is recommended.

Pulverization: Construction begins with pulverizing the existing asphalt pavement using equipment that resembles a large rototiller. (This pulverizing/mixing equipment is also commonly used to mix cement with soils when stabilizing pavement subgrades.) The depth of pulverization is usually 6 to 10 in. (150 to 250 mm), which on secondary roads will typically include all of the surface and base, plus some part of the subgrade. To achieve the proper gradation after pulverization, more than one pass of the equipment may be necessary. The particle distribution should be such that 100% passes the 3-in. (75-mm) sieve, 95% passes the 2-in. (50-mm) sieve, and at least 55% passes a No. 4 (4.75-mm) sieve.

Shaping and Grading: The pulverized material is shaped to the desired cross-section and grade. This could involve additional earthwork in order to widen the roadway. Final base elevation requirements may necessitate a small amount of material removal or addition.

Spreading Cement: A measured amount of cement is spread either in dry or slurry form on the surface of the shaped roadway.

Pulverizing the old road.

Initial shaping and grading.

Application of cement.

Water Application: Water is added to bring the aggregate-soil-cement mixture to optimum moisture content (water content at maximum dry density as determined by ASTM D558). When the pulverized material is very dry (well below optimum moisture content) an initial application of water is normally added and mixed into the pulverized material prior to spreading the cement.

Mixing: The aggregate-soil-cement-water mixture is combined and blended with the pulverizing/mixing machinery. More than one pass of the mixer may be required to achieve a uniform blend of materials.

Compaction: The mixture is compacted to the required density of at least 96% of standard Proctor density (ASTM D558). The compaction is usually performed with vibratory rollers. A pneumatic-tired roller may follow to finish the surface. Final compaction should take place no more than 2 hours after initial mixing of the cement. The field density and moisture are monitored for quality control purposes.

Curing: The goal of curing is to keep the base continuously moist so the cement can hydrate. The completed base should be coated with bituminous primer to seal in the moisture. Another method of curing is to keep the base constantly moist by spraying water on the surface.

Pavement Surface: The new pavement surface consisting of a chip seal, hot-mix asphalt, or concrete is constructed to complete the FDR process.

Quality Control: FDR with cement follows the same basic procedures used for normal soil-cement operations. The success of a reclamation project depends upon the careful attention to the following control factors:

- Adequate pulverization
- Proper cement content
- Proper moisture content
- Adequate density
- Adequate curing

Mixing water and cement into the aggregate-soil mixture.

Compaction.

Curing.

Start with a Good Foundation

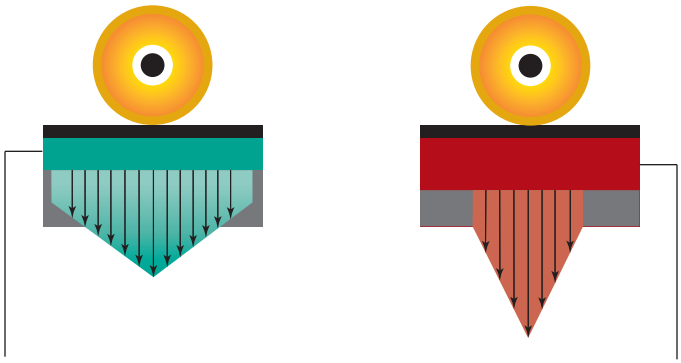
A good foundation is important for any structure, especially pavements. The pavement base provides the thickness and stiffness necessary to carry the design traffic.

Cement-stabilized bases have provided economical, long-lasting pavement foundations for more than 70 years. These pavements combine soil and/or aggregate with cement and water, which are then compacted to high density. The advantages of stabilization are many:

- Cement stabilization increases the stiffness and strength of the base material. A stiffer base reduces deflections due to traffic loads, which results in lower strains in the asphalt surface. This delays the onset of surface distress, such as fatigue cracking, and extends pavement life.
- The strong uniform support provided by cement stabilization results in reduced stresses applied to the subgrade. A thinner cement-stabilized section can reduce subgrade stresses more than a thicker layer of untreated aggregate base. Subgrade failures, potholes, and road roughness are thus reduced.
- Moisture intrusion can destroy unstabilized pavement bases, but not when cement is used to bind the base. Cement-stabilized pavements form a moisture-resistant base that keeps water out and maintains higher levels of strength, even when saturated.
- A cement-stabilized base also reduces the potential for pumping of subgrade fines.

Stabilized Base vs. Unstabilized Base

A stabilized base spreads loads and reduces stress on the subgrade.



Cement-Stabilized Base **Unstabilized Granular Base**

Old Asphalt, New Foundation

Stabilizing the old asphalt surface, granular base, and underlying subgrade soil with cement creates a strong foundation for the pavement. Usually, there is little need for material to be removed or added. The old, brittle asphalt, when pulverized, becomes a "black gravel" that will bond to hydrated cement readily. In case the existing asphalt pavement does not meet the aggregate requirements for a good stabilized base, additional aggregates can be readily incorporated into the recycled aggregate during construction.

Pulverized material.

The Problems with Old Asphalt Pavements

Asphalt pavements eventually wear out. Just like old cars or clothing, the effects of wear and climate will destroy the pavement. As the roads deteriorate, they require costly maintenance to stay in service.

Asphalt pavements typically fail in several ways. The most common include:

Fatigue cracking: Traffic causes repeated strain in the surface and eventually the asphalt cracks.

Rutting: Loads from channelized traffic shift the materials in the surface, base, and subgrade, leaving depressions or ruts in the pavement.

Recycling old asphalt pavement using FDR.

Shoving: The forces created by cars and trucks braking and stopping separate the surface material from the underlying base.

Loss of base or foundation support: Moisture degradation, traffic overloads, or subgrade failure can cause the pavement base to fail.

The type of failures mentioned above are especially prevalent in secondary roads, where pavement structures are typically light, and are often not designed for today's increased traffic levels. Repairs can be costly. A typical maintenance treatment, like a thin asphalt overlay, will only temporarily cover up the problem. Other options, such as thick overlays or removal and replacement, are expensive.

What Roads are Candidates for FDR with Cement?

FDR is most appropriate under the following conditions:

- The pavement is seriously damaged and cannot be rehabilitated with simple resurfacing.
- The existing pavement distress indicates that the problem likely exists in the base or subgrade.
- The existing pavement requires excessive patching.
- The pavement structure is inadequate for the current or future traffic.

Serious Damage or Base Failure

The engineer can evaluate the reasons for pavement failure by observing the types of distress that are visible. For example, alligator cracking, deep depressions, or soil stains on the surface are all signs of base or subgrade problems in the pavement structure.

Excessive Patching

Although patching is often necessary to keep a road serviceable, it can be expensive. In fact, once the area of full-depth patching exceeds 15% - 20%, simple economics makes it less expensive to use FDR rather than to perform the patching. Of course the final product achieved with FDR is far superior to a road that is heavily patched.

More Information

PCA offers a broad range of resources on soil-cement applications for pavements. Visit our Web site at **www.cement.org/pavements** for design and construction guidelines, technical support, and research on cement-modified soils, cement-treated base, and full-depth reclamation.

For local support, tap into the cement industry's network of regional-groups covering the United States. Contact information is available at **www.cement.org/local.**

Base distress.

Excessive patching.

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An organization of cement companies to improve and extend the uses of portland cement and concrete through market development, engineering, research, education, and public affairs work.

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