

COMMON FOUNDATIONS

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Road Weary

Concrete Pavement

While most of us are familiar with asphalt pavement, concrete is also used in many parts of the country, most often in residential construction for driveway pads and curbs. Although both paving materials are load bearing aggregates held together by a bonding agent, concrete paving (unlike asphalt paving) is not flexible. As a hardened surface, it is often reinforced with iron bars or wire mesh. Cracks may occur in a very short time if the concrete is improperly installed. However, freeze/thaw cycles can also create cracking, similar to that seen in asphalt. Concrete may also suffer spalling, which is the loss of material at the surface, and potholes.

Concrete pavement rarely gets coated or waterproofed. If there is steel reinforcement (rebar) in the concrete, such as in bridge decks or parking garages, the concrete should be coated to protect the steel from moisture and corrosion. Crack filling and pothole repair are the big things to watch for. Maintenance of any concrete joints is also important.

While concrete pavements tend to be more common in the West, it can also be very common in localized areas where the materials are more readily available. Concrete pavement can also be more durable in high-temperature environments than the more flexible asphalt concrete pavement. The differences between the two types of pavement come down to construction costs, durability, and life-cycle costs.

If you have a major paving job for your condo complex, it is best not to wait till the last minute. Now is the time to plan and get your best prices before spring has sprung.

When it comes to paving projects, often the Board needs an education on the paving issues and options available. There is a lot of misinformation out there. There is no better way to have a meeting's agenda go astray than when no one knows the difference between or benefits of seal coating and a binder top.

So let us start with the basics. Asphalt pavement is also called bituminous concrete. It is called "concrete" because like cement-based concrete, bituminous concrete has a mineral aggregate of stone and sand. This aggregate is held together with a binder of petroleum derivative asphalt. Its advantage over concrete is that it is more flexible and less expensive than concrete pavement. It also handles deicing salt and subsurface movement better than concrete.

When it comes to the unit cost of materials vs. volume, the cost issue is very important as 30% of the cost of asphalt paving is the aggregate while 70% of it is the asphalt binder. This is particularly important when the price of a barrel of oil



spikes higher, which then has a ripple effect on asphalt – hence, the need to lock in a paving project while the price of oil is at its lowest.

Different soil conditions (e.g., sandy subsurface vs. clay) will warrant a different mix of asphalt paving, but this will be addressed by whoever creates your bid documents and specifications (See [*Specifications – Key To a Successful Job*](#), Criterium Engineers Common Foundations, 2011). For planning purposes, your Board should assume paving will last about 20 years. Because it is a major cost for some condominium complexes, it should not just be a line item in your reserve fund budget; there should also be a separate Pavement Maintenance and Capital Improvement Plan with its own committee.

For purposes of discussion, we will assume there are existing asphalt-paved roads, parking areas, and/or driveways. Typically, roadways have a sub-base of 4 to 8 inches of well-drained, compacted soil and gravel mix. The first layer of paving is called the binder course and is 1½ to 2 inches thick. This is covered by a topping coat of 1½ inches.

If it were not for the sun and water, asphalt paving would last a long time, but paving begins to deteriorate as soon as water begins to penetrate into the binder course and the UV rays remove asphalt from the topping coat. This can happen in less than 5 years. This is why adding a sealing coat in the first 2 to 5 years is sometimes recommended. It is also an area of confusion.

Sealing coat materials do not add back the asphalt that was lost due to UV deterioration. They only protect the pavement for a period of time from further deterioration such as shrinkage cracks and raveling (i.e., loss of surface aggregate). Sealing does not bridge large cracks or fill in roadway depressions. Therefore, if the pavement is over 5 years old and has never been seal coated, it has lost its chance for any physical benefit for the life of the pavement. At that point, it is only a cosmetic remedy.

When water begins to infiltrate the pavement in colder climates, the freeze/thaw cycle takes its toll. The small cracks become larger in the binder course, and eventually the sub-base begins to fail. At this point, surface cracks, settlement, alligatoring, and other visible surface signs make an appearance. Your Maintenance Plan should immediately address these problems by making crack filling a yearly project. The cracks should be filled with standard joint filler to within 1/8 to ¼ inch of the top of the crack.

Similarly, surface depressions and sink areas should be addressed annually as well. These problems are typically due to poor subsurface soil conditions and need to be addressed or the settlement will continue. It is important to not allow ponding of water in the roadway or parking lot to minimize water infiltration, hydroplaning and to eliminate slipping hazards.

After 15 years, major paving projects might present themselves. Sometimes a major resurfacing project can be delayed with judicious removal of large areas of deterioration and repairing the sub-base followed by a 1½-inch binder with a 1½-inch top coat. If the roadway or parking area deterioration is judged to be widespread, the options include a reclamation project where the top 6 to 12 inches of pavement and sub-base are ground into a recycled material that can be reused for a compacted and graded foundation for a new paving surface. This minimizes trucking and labor costs and extra materials costs. So if you are on the paving committee, it may be time to hit the road.

Getting Started With a Maintenance Plan

If your association has a lot of roadway or parking areas, it is not necessary to wait for a full reserve study to assess the condition and begin planning. Criterium Engineers is happy to visit your property and provide an assessment of just the paved areas. We use a checklist and rating system to establish an overall current condition and immediate requirements. We can then help put together an annual maintenance plan that you can provide to your contractor. As with most site and building elements, maintenance pays for itself. In one study by a Hartford, CT firm, maintaining pavement saved an average of \$1.30/square foot over a 15-year term.

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