



# **A COMPLETE GUIDE TO ASPHALT PAVEMENT**

Commercial Asphalt Maintenance & Repair



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# PROTECTING YOUR SINGLE LARGEST INVESTMENT.

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It is quite possible that the single largest investment you will manage on your property is the pavement surface. Managed and cared for properly, your pavement can last 20 years or more. Managed improperly, or if decisions are not made in a timely, cost-effective manner, your pavement could last as few as 10 years. So the value of making sound pavement construction, maintenance, and repair decisions is more than aesthetic—it's economic. This guide will help you make those decisions as efficiently and cost-effectively as possible.

This guide is unique. It's written to assist folks like you who don't work in the construction field but who need on occasion to understand construction. In fact, it's the only guide we know of that explains the pavement construction and maintenance process from beginning to end in a straightforward manner. To make it easier to use, we've divided it into sections so you can quickly locate and focus on the topic that pertains to your property and upcoming work. Basics are covered first, followed by a discussion of the process of awarding a job to a contractor. Next are non-technical explanations of various pavement maintenance options, and we conclude with a glossary to help keep things clear. We've organized this guide so you can work through it from beginning to end—or just flip to the section you need and get your job rolling.

Our goal is to simplify the process of pavement maintenance, and whether or not you hire ACI Asphalt & Concrete, Inc. to be your pavement contractor, following this approach will ensure that you will be providing a quality asphalt pavement for your property, as well as getting the best possible return on your pavement investment by making certain it lasts as long as possible.

# THE PAVEMENT LIFE CYCLE

Asphalt pavements, like everything, have a life cycle. They start out new, they age, and eventually they decline to the point where they need to be replaced. How long pavements last depends on a variety of factors, including how well they are constructed initially, the weather, the amount and weight of traffic and—most importantly—how well they are maintained. A well-constructed asphalt pavement that experiences low levels of traffic can last 20 years or more. That life can be substantially extended—and provide a greater return on your pavement investment—if proper maintenance is performed on a regular, timely basis. Maintenance options are outlined in detail, complete with photos, beginning on page 13, but the most-common maintenance options are sealcoating, crack sealing, patching and asphalt overlay.

While it's essential to have a contractor evaluate your pavement to determine its specific maintenance needs, a pavement's life cycle falls into five broad stages. Determining where you fall in the life cycle is a fairly straightforward process, and using these five stages you can get some idea of the types of maintenance you will need. We've summarized a pavement's life cycle in the following chart:

## Stage 1: New Pavement (0–1 Years)

- ♦ Little or no maintenance required, sealcoating, crack sealing

## Stage 2: Initial Preventive Maintenance Phase (2–5 Years)

Typical maintenance procedures:

- ♦ Sealcoating, crack sealing, patching

## Stage 3: Minor Repairs and Continued Preventive Maintenance (5–15 Years)

Typical maintenance procedures:

- ♦ Patch repairs, crack sealing, sealcoating

## Stage 4: Major Repairs (15–20 Years)

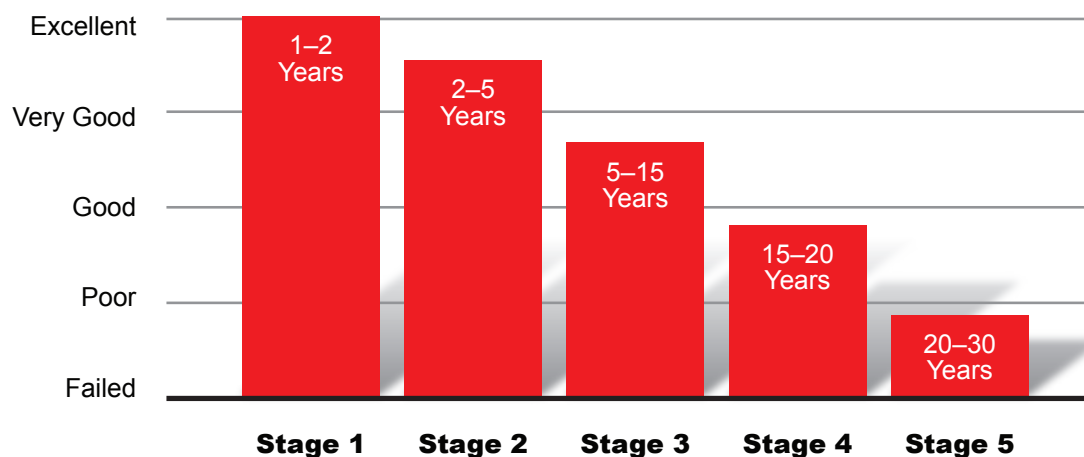
Typical maintenance procedures:

- ♦ Extensive patching repairs, asphalt overlay

## Stage 5: Extensive Repairs or Complete Reconstruction (20–30 Years)

Typical maintenance procedures:

- ♦ Major repairs throughout the property or complete removal and replacement of the asphalt



# SHOULD YOU RELY ON A PAVEMENT RATING SYSTEM?

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There are a number of different rating systems used by contractors and engineering companies to determine the condition of an asphalt pavement. These systems generally rate your pavement on a 1–10 scale (or similar measurement system), then apply a corresponding maintenance technique that matches that pavement condition.

The thing to remember is that any “system” has a degree of subjectivity, and results, ratings, and recommendations can vary substantially depending on the person doing the evaluation. It’s important to have a clear recommendation and reason regarding which maintenance procedures should be used for a specific pavement surface. Simply saying a pavement is a “6” on a ratings chart does not really tell you what should be done and why, nor does it explain what caused the problem.

At ACI Asphalt & Concrete, Inc. We start with the straightforward system described in this guide because it provides specific recommendations at each stage of the life cycle. For example, if you’re at stage 3, you know that crack sealing, sealcoating and minor repairs are probably your best maintenance options.



# MAKING A DECISION:

## Why the Time is Now!

Deciding “what to do” is probably the single toughest part of any pavement maintenance project. You might be unfamiliar with the processes, terminologies and costs associated with paving or pavement maintenance work. This can lead to confusion, frustration and uncertainty about what to do and exactly how to proceed. Even if you have some experience with pavement projects, it’s likely that you’ll have a difficult time sorting through the different recommendations that you are likely to receive from the contractors you engage. Too often this complexity can lead to substantial delays in the project or, in some cases, to giving up on the project.

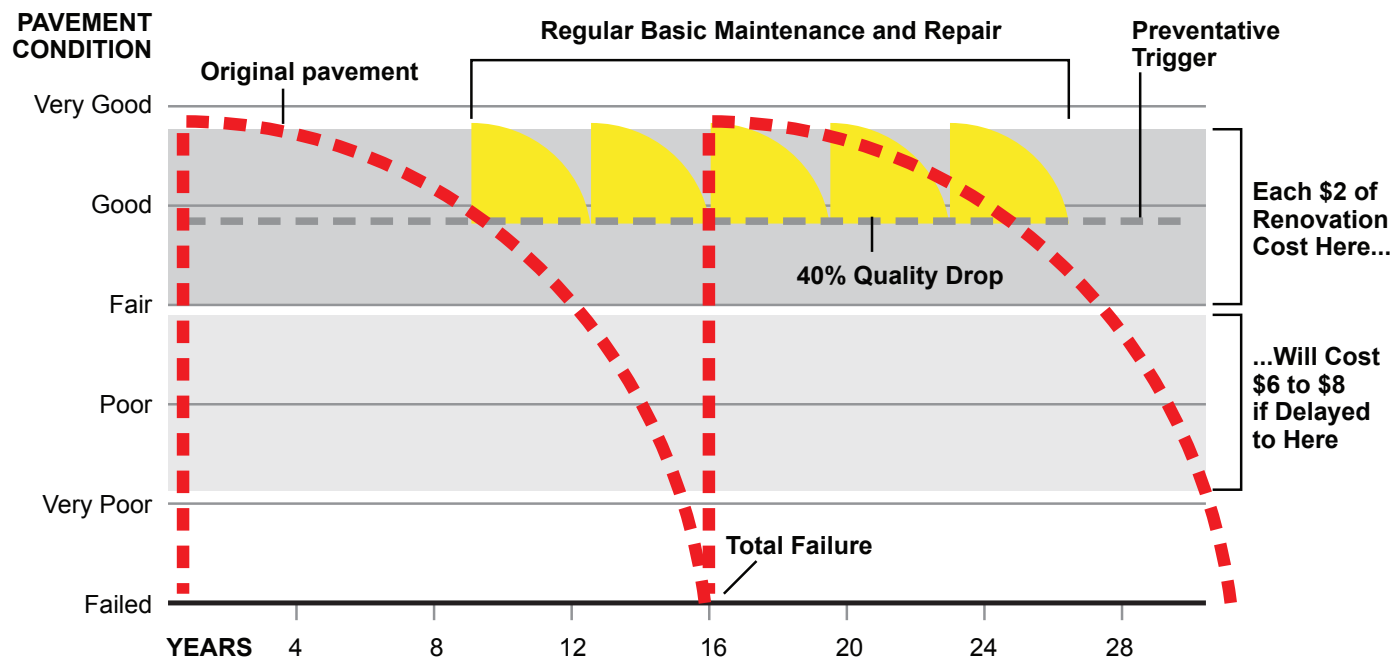
But don’t delay.

Any time a repair or maintenance is deferred you run the risk of transforming a simple or modest project into a far more costly and time-consuming one. That’s because (unlike wine), asphalt pavements do not get better with age.

The effects of weather, traffic and sunlight conspire to break down a pavement over time, so simply shelving a project until “later” will only increase the chance that the solution will be more involved, more expensive, and more inconvenient to tenants or employees.

Your goal as you begin the work to extend the life of your pavement investment should be to simplify the process from beginning to end. Not only will that make the work easier (and clearer) for property owners and managers, it will result in the proper maintenance option, performed at the appropriate time, by a reliable contractor—for a cost-effective solution to your pavement repair. Relying on this guide is the first step in that simplification effort.

### The Cost of Timely Maintenance



# SCOPE OF WORK:

## What is it and Why is it Important?

Once you have determined the work on your pavement does need to take place, you need to decide what kind of work and how much of it. This is referred to as “scope of work” and should include all the main components of the proposed project.

This is an essential step in the success of the project because a properly thought-out and well-written scope of work is the foundation for getting the job done properly, on time, and within budget. A clear scope of work also greatly lowers the chances for confusion as to what’s included in your project.

There are several ways to help determine what your scope of work should be. The three most common are:

- ♦ **Apples to Apples** — Choose one contractor to determine the scope of work and provide the details for the project
- ♦ **Consensus Approach** — Meet with multiple contractors at the same time and have them collectively decide what to do
- ♦ **Design/Build** — Select one reputable contractor’s and allow them to design independent solutions that can then be reviewed and evaluated

### Apples to Apples

One contractor or firm creates the work scope and is compensated and distributes it to all interested parties.

Advantages:

- ♦ Exact bids are received and can be evaluated based on factors such as price, warranty offered, company reputation, prior work history and scheduling
- ♦ Easier to compare bids because line items are similar

Disadvantages:

- ♦ Tends to be a race for the lowest price
- ♦ Can exclude valuable input from contractors who did not develop the initial work scope
- ♦ Depending on the quality of specifications (or expertise of bidding contractors), the resulting bids may still have some variation in key areas
- ♦ Little emphasis on the long-term objectives for the pavement



### Consensus Approach

Two or more contractors attend a “job walk” and work together to determine what types of work need to be done.

Advantages:

- ♦ Similar to Apples to Apples

Disadvantages:

- ♦ Tends to be a race for the lowest price
- ♦ Determining what work should be done can be problematic if a consensus can’t be reached
- ♦ You are unlikely to learn what each contractor can do best because they won’t want to share their detailed business advantage with their competitors

## Design/Build

After discussing the project objectives and inspecting the property, each contractor submits a proposal for consideration. Proposals generally have the same end result but could suggest different construction approaches that will have the same result.

### Advantages:

- ◆ Because each contractor works with the owner or property manager in advance, the goals are defined up front and can be weighed against budget or other constraints
- ◆ When done properly, there is a thorough understanding of the job, and expectations are clearly defined and understood
- ◆ Can be a blueprint for longer-term maintenance planning or multi-year projects
- ◆ Lowers the potential for costly short-term work
- ◆ Property owners and managers have a chance to “get to know” the contractor

### Disadvantages:

- ◆ Generally does not guarantee lowest possible price
- ◆ Might require more up-front involvement from owners and/or management

## Summary on Scope Creation

Each of the above approaches can be used on most projects. The key is to pick the one that's right for you and your situation. It might be that your property only needs some basic routine maintenance and, therefore, a Design/Build approach is probably not needed.

If, however, you are in stages 4 or 5 of the pavement life cycle, you need to consider taking a long look at the Design/Build option and be sure that all your concerns and questions are addressed in the early stages of the project. After all, stages 4 and 5 are the most costly phases of pavement maintenance and a mistake in scope at those stages can be very difficult and expensive to correct in the future.



# TEAMWORK:

## You and Your Contractor

Once you've decided to move forward, it's essential you select a contractor you can work with. While it's true that you are hiring a contractor because of the firm's technical expertise and ability to get the job done, you want to make sure you are comfortable with the contractor's staff so you can be open and frank and understand and respect your needs, and who understand the needs of your tenants or employees. The contractor you hire will be working on your property and should be more than willing to communicate with them and respond to their needs and reasonable demands.

Just as you wouldn't hire someone sight unseen to work in your home, you shouldn't hire a contractor you haven't met. This seems obvious, but too many owners and managers make a hiring decision based solely on a number on a piece of paper, and that's just not the basis for a strong working relationship—or a good result.

### Take a Walk with Your Contractor “Partner”

Once you've determined your project goals, meet on site with your contractor and walk through the property. This gives you an opportunity to further refine the scope of work and it will also give you some insights that enable you to compare one contractor with another as you both walk the property. Is he or she willing to take the time to show you problems and suggest fixes? Does the pavement consultant offer alternative solutions to problems you are trying to fix? Is he or she listening to you as you express concern for your tenants or employees?



### What's Your Comfort Level?

It's important to remember that the contractor is responsible for “How” the job gets done—but you or the operations manager need to participate in the “What” part of the project to get the best results possible. So you need to be comfortable providing any input you consider important, asking any questions, discussing any special constraints or considerations on the project, whether they are budget, technical, logistical or even political. All these are important to you, so they need to become important to the contractor you hire.

As you walk the property, be open to suggestions from the contractor about alternative approaches you could consider. There's more than one way to tackle a challenge and a contractor might come up with a suggestion that could save you some money or result in a longer-life repair. Discuss the job with him or her, provide honest feedback, and make sure you get clarification on everything. This is the time to modify the scope of work if necessary.

# MAKING YOUR CHOICE:

## What's the Best Proposal for You?

Okay, you've met a contractor, walked the property and discussed the job. Now the contractor is going to put together a proposal on how the job will be approached and how much it is expected to cost. Nowadays proposals can be in print, in some type of digital document, in an e-mail—but the type of the proposal isn't nearly as important as what is in it. The first thing you should notice is that your concerns—whatever they are—are addressed and handled the way you need them to be handled.

Once you have your proposals, you need to evaluate what's in them, determine what they really mean, and compare them to one another. As your property manager can tell you, this can be pretty darn frustrating. The main thing to remember is that all effective proposals should contain enough detail so you can easily understand exactly what will be done, where, how and when. A detailed proposal protects you by clarifying exactly what will be happening, specifically where and when the work will be done, and the cost for making it happen.



## What Every Proposal Should Include

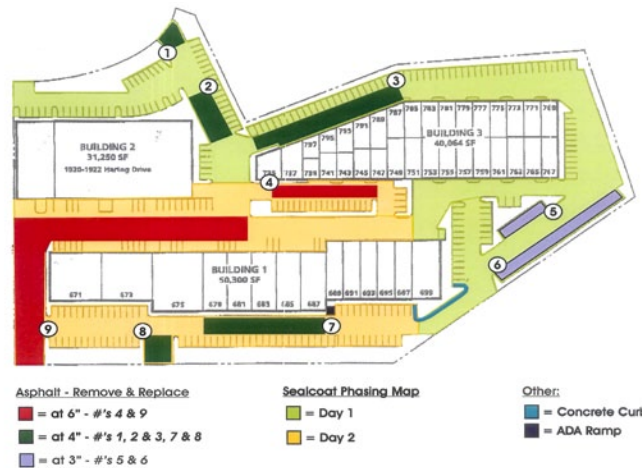
Every proposal should clearly list a type of work that will be done with a complete description of that work and a cost breakout of that portion of the job. While the proposal format can vary substantially from one company to another, there are “must have” items that you should insist on seeing, including:

- ♦ A clear, brief layman's explanation of the job in general
- ♦ Square footage or linear footage of each part of the job
- ♦ Number of locations (of patches) and depth of patch repairs
- ♦ Site map showing exact locations of repairs and their dimensions
- ♦ Sealcoating details including areas to be sealed, number of coats, and types of coats (sand/no sand, additive/no additive)
- ♦ Whether or not pavement markings are included
- ♦ Crack sealing details including process and materials
- ♦ Paving details including thickness of compacted asphalt
- ♦ Warranty information
- ♦ How long the job will take to complete
- ♦ Planned process to notify tenants or employees of project dates, times and contact information
- ♦ How change orders are handled once the job has begun
- ♦ How long the quoted price remains in effect before you must make your decision

## Nice, But Not Necessary

The previously listed items are “must” items and any proposal that does not include them should be questioned. Additional items that can make the job go more smoothly for you and your residents include:

- ♦ Photographs of areas to be repaired
- ♦ Cover letter explaining the proposal
- ♦ Summary of contractor qualifications
- ♦ References



Site plans are critical to making sure you know exactly where the repair locations are and what the dimensions of the repairs will be.

## Keep in Mind “The Big Picture”

As we all know, “the devil’s in the details” of most any project, large or small. But that doesn’t mean you should forget about the big picture. Once you have examined all the details in the proposal, you need to take a step back, look at the entire package, and ask yourself: “Does this do what we want?” When you began the process of deciding how best to extend the life of your asphalt pavement, you had clear goals and objectives in mind. Make sure that the proposal you are considering meets or exceeds those goals and objectives.

Depending on the dollars involved and the extent of the repairs, this can be a fairly simple process. Referring back to the 5 Stages introduced earlier, if your project is in Stage 1 or 2, then the objective is usually easy to define and understand. But if your job involves pavement in the later stages of its life cycle, you need to make sure that the proposals you’re receiving are really in line with your overall plan. In later stages, there’s often disagreement among contractors as to how best to approach a given situation and this leads to a wide variety of proposals that can range from too little work (sealcoating an already failed pavement) to too much work (paving an area that needs only basic crack sealing or sealcoating).

## Beware the “Great Deal” or “left-over mix”

Obviously the less work done, the lower the cost of the project, so keep in mind that what might look like a “great deal” may in reality be a scaled-down version of the overall repair plan you really need. It might look as if you’re saving money but if the solution is an inappropriate one, it could be a false savings. It’s true that larger, more complex projects have higher up-front costs than smaller, simpler work. By making the appropriate repair at the most cost-effective time, though, you will be getting the most “bang for your buck,” and that results in a substantial long-term savings for your property.

The bottom line is that you need to have a solid and clear understanding of any proposal before you sign a contract. This protects your property and helps ensure that you get the end result that you want. It also helps to provide clear directions as to the contractor’s responsibilities. Pavement maintenance is one of the largest expenditures property owner or manager can make and mistakes in this area can have long-lasting impact for the property. (left over mix is often cooled and inferior and will fail).

# ONCE CONSTRUCTION STARTS:

## What You Should Expect

There should be no surprises here—for you or your tenants or employees. A well-managed project starts with a clear understanding of all aspects of the project and how it will progress. The contractor you select must be prepared to lay everything out for you in advance and keep you and your residents updated on an as-needed basis. That means you should expect some or all of the following:

- ◆ Pre-construction meeting (or phone conference) to answer all concerns for all parties.
- ◆ A clear notification system, such as door-to-door notices or street signage, to let tenants and employees know how work will affect them.

Notifications should include:

- ◆ Construction dates
- ◆ Project “Start” and “Stop” days and times
- ◆ Site map showing work areas for each phase of the project
- ◆ Parking restrictions
- ◆ Brief description of the project
- ◆ Contact information

If a tenant or employee does have a concern, he or she should contact the project manager, the property manager—not the workers on the job. Crew members are following agreed-upon directives from their boss ( you), so they usually won’t have the authority to change what they are doing. Changes need to come from management down through an agreed-upon chain of command already in place. This lets the crews on the jobsite focus on their job and it helps maintain the safest working environment possible for both crew and tenants/employees.

It’s important that property managers follow directives for detours and parking during and after the job. Just because a crew and equipment are gone, doesn’t mean a pavement is safe to drive on. The public should remain off the pavement until a contractor representative removes traffic control materials and any associated signage.

# SHOULD YOU HIRE A CONSULTANT OR ENGINEER?

This is a question that many Property Managers and Owners struggle with answering: “When do we hire an outside person to help?” The best way to answer this is to determine where you are on the pavement life cycle and what your project objectives are. If you are at stages 1–3, then it’s very unlikely that you’ll need to incur the expense of a pavement engineer or consultant. Maintenance procedures in these stages are generally very straightforward and with no added benefit from soil and lab testing or detailed traffic analysis.

If, on the other hand, your pavement or large portions of your pavement are in the later stages of their life cycle, you could be looking at a more complex project. In that case you might consider hiring an engineer or consultant who uses standard pavement engineering analysis tools.

## Consultant vs. Engineer

If you do decide to bring in an expert, should it be a pavement engineer or a pavement consultant? We recommend pavement engineers. These folks specialize in asphalt or concrete surfaces and the underlying soils in roadways and parking lots. They typically have one or more licensed Professional Engineers on staff and can evaluate virtually any surface and then design a pavement repair or maintenance solution specific to that surface.

As with many construction projects, engineers can differ on the best solution for a given pavement problem, so a good practice is to ask the engineer to provide possible alternatives to the proposed plan; you then can ask a construction expert to provide estimates for each alternative.

## Another Option: Design/Build

An alternative to the engineer/consultant approach is to engage a paving or pavement maintenance contractor who provides “Design/Build” services. This process is similar to what an engineer does, but in this case the contractor teams up with the engineer to find the most cost-effective solutions for the entire project. This approach combines the “how” strengths of the contractor with the “why” strengths of the engineer, resulting in a high-quality plan and finished job. This is a departure from the standard “get three bids” approach and will have a higher up-front cost. The advantage in terms of long-term success and cost-effective decisions far outweigh any initial higher costs. Plus, with “Design/Build” the success of the project rests with one firm—the contractor—and that company maintains an active role from initial design through construction completion.



# KEEPING ACCESSIBILITY IN MIND

## ADA Compliance

ADA compliance can be a frustrating and expensive issue for property owners to navigate. Regulations vary substantially among local, state and federal agencies and it takes specialists in this area to truly understand what needs to be done to ensure that your property is ADA compliant.

Fortunately, there are contractors, engineers, architects and ADA Compliance Specialists that can guide you through both the technical and the legal issues you face and can design solutions that are both compliant and cost effective.

### Step 1 – ADA Survey

An ADA survey is the first step towards identifying where the non-compliant areas are and how best to address them. Experienced contractors can complete this step but there are times when the problems are more difficult to solve and ADA specialists may be required.

Stage one of the survey will be to determine how many and what type of handicap stalls are required. In general the formula is (1) handicap stall per (25) total stalls per parking lot. This will vary if the lot is a medical building or if the entire parking lot is larger than 1,000 stalls.

Stage two is to make sure that the existing stalls have the correct signage, paint markings and access aisles as well as correct signage and parking stall sizes to accomodate new sizes for handicap van loading and unloding with proper access aisles.

Stage three is to check the slope of the pavement in both the handicap stalls, access aisles and the associated paths of travel.

Stage four is to make sure that the sidewalk ramps and paths of travel are compliant.

The final step is to ensure that the entry signs to the lot are of the correct type and the information on the sign is current.

### Step 2 – Corrective Action Plan

This is where you create a plan that specifically identifies the areas for correction and where it may be necessary to have detailed drawings made that can be used for construction and permitting. Not all ADA projects require this level of detail but it is very common for government agencies to require ADA improvements if major renovations or tenant improvements are being performed.

### Step 3 – Construction

In this step, you select a contractor to perform the work per plan. It is very important to select someone with extensive experience in ADA compliance, as mistakes here can be very expensive and time consuming.

### Summary

This is a very brief overview of ADA and the regulations surrounding ADA change almost every year. To ensure that your property is in compliance, look to contractors and ADA experts that can not only identify the areas for correction, but can also perform the work to ADA standards.



# TERMS AND PROCEDURES YOU NEED TO KNOW

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One of the most difficult aspects property managers face when getting pavement maintenance work done is understanding the technical terms the work requires. To make this easier we've defined the terms you will likely be working with as you seek bids and evaluate plans to repair your pavement. Referring to these explanations will help make sure you and the contractor are on the same page, comparing "apples to apples" throughout the job. Following these more common terms is a general glossary covering a broader group of terms you will encounter less often. Both groups are explained in a straightforward, nontechnical manner.



## Accessibility

**ADA (Americans with Disabilities Act) Defined**—Under Title III of the 1990 Act, no individual may be discriminated against on the basis of disability with regards to the full and equal enjoyment of the goods, services, facilities, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation. "Public accommodations" include most places of lodging (such as inns and hotels), recreation, transportation, education, and dining, along with stores, care providers, and places of public displays, among other things.

What this means for property owners is that they are obligated to provide handicap access to their buildings to all tenants, customers and their employees. This area can be difficult to navigate and as such, you need to hire a contractor who has extensive experience with these types of projects. In addition, there are firms that specialize in ADA compliance and they, along with architects and engineers, can develop detailed plans and specifications that will ensure that the property complies to the latest regulations.



## Alligator Cracking

The single most-damaging pavement defect is cracks, because cracks allow water to penetrate the base beneath the surface. When water gets beneath the surface, it eventually causes greater and more widespread cracking, potholes, and eventually general pavement failure. Research has shown that sealing pavement cracks is the most cost-effective approach to extending the life of a pavement.



## Asphalt Overlay

A common and cost-effective approach to extending pavement life is an asphalt overlay (also referred to as resurfacing). As its name implies, an overlay is a new layer of hot mix asphalt, generally 1½ – 2 inches thick after compaction, is constructed over the top of an existing asphalt or concrete pavement. Often a paving fabric interlayer is placed between the pavement and the overlay as a way to strengthen the bond and to reduce reflective cracking. When constructed properly and at the appropriate time in a pavement's life cycle, an overlay helps extend the life of your original pavement, giving you a greater return on what you have already invested in your road or parking lot.



## Base

Generic term for material installed prior to asphalt paving. Base material can be crushed stone or recycled asphalt pavement. The base material is important because it provides the load-bearing strength of the finished pavement. Depending on the traffic volume and weight of vehicles expected to use the pavement, the base can range from 5–6 inches thick for a residential driveway to 18 inches thick or more for parking areas or roadways. The correct type and thickness of base material must be specified in the contract prior to paving. Lack of adequate base material is a primary cause of pavement failures.



## Base Failure

Base failures occur when the crushed stone layer beneath the hot mix asphalt paved layers and driving surface can no longer adequately support the weight of the structure or the traffic. Base failures can occur for a number of reasons, including: ground water, too much weight, and inadequate design. The failure can often be corrected by excavating the failed material and replacing it with base rock, stabilization fabrics or lime/cement treatments and then repaving the surface.



## Compaction

Compressing a given volume of material (such as 2 inches of hot mix asphalt) into a lesser volume (such as 1½ inches of hot mix asphalt). This process is essential both on a pavement's subgrade and base, as well as on the hot mix asphalt paving layer. Properly compacted asphalt pavement creates a more dense pavement, which makes the pavement stronger and helps it last longer. Paving compaction is done with steel or rubber-tire rollers, often with vibration added to create greater density. Depending on the thickness of the asphalt layer, plate compactors are also effective.



## Complete Reconstruction

Just what it says: complete removal and reconstruction of the asphalt pavement to the depth of the base rock section, typically used in stages 4–5 of the pavement life cycle. While every pavement eventually requires complete reconstruction, you can delay this costly job through timely use of proper pavement maintenance techniques.



## Infrared Repair

An asphalt pavement surface repair process that uses radiated heat to soften existing pavement. The heated pavement is then raked, additional hot mix is added as needed, and the area is compacted using a roller or plate compactor. Infrared repair allows for quick repairs requiring less new material and facilitates repairs in weather too cool for conventional paving methods. Not appropriate for areas of base failure or those requiring structural repair.



## Patching/Paving

Also known as R&R (removal and replacement) or “digouts,” this process is generally used to repair damaged pavement where the damage is caused by failure of the base or subbase material beneath the asphalt. R&R involves saw-cutting around the edges of the failed asphalt, removing the old pavement and base material down to structurally sound material, and then reconstructing the patch with new base and hot mix asphalt. Patch paving is typically used during stages 3–4 of a pavement’s lifecycle. Not only does it improve the structure of the pavement, it also protects the surrounding structurally sound pavement by removing the source of potential damage.



## Rout & Seal (crack sealing)

Because cracks are the most lethal problem a pavement can have, all cracks  $\frac{1}{4}$  inch wide or wider must be rout and sealed to prevent water infiltration and protect the life of the pavement. (routing is opening the crack to assure the material fills the entire crack to stop water penetration) Small cracks (less than  $\frac{1}{16}$  inch wide) are generally not sealed because the material will not penetrate the surface, and sometimes (though rarely) very wide cracks are sealed with sand-asphalt mixtures. A number of materials are available for sealing cracks but the most well known and most cost-effective is hot-rubberized crack sealant.



## Sealcoating

Sealcoating is the process of applying a protective material to the surface of an asphalt pavement—much like applying paint to the wood siding of a house. The sealer material is a watery mixture of emulsified asphalt, water, mineral fillers, and possibly various additives such as latex and modified polymers designed to speed the drying process and strengthen the dried sealer. Sealer is applied directly to the surface of an asphalt pavement by use of a rubber squeegee, broom, or mechanical spray.

As its name implies, sealcoating seals the top of the asphalt, preventing water from penetrating the surface of the pavement and protecting the top layer of asphalt from oxidation and wear caused by exposure to sun and air. While sealcoating does not improve the structure of the pavement, it does improve the look of a pavement, providing a smooth, black, even surface that is ideal for painting lines and sweeping.

Sealcoating is designed for off-highway use on pavements in parking lots, homeowner associations and driveways, where there are low traffic speeds the turning radius is tight. Sealcoating is different from slurry seal, a higher-tech process that requires a much coarser aggregate filler and is designed for use on high speed areas with straight rolling traffic.

# GLOSSARY

## Pavement-related Terms

**Aggregates** — Various sized stones, crushed rock, gravel, etc. that make up approximately 92–96% of hot mix asphalt. (Asphalt cement makes up the other 4–8 %.)

**Asphalt** — The common name for “Bituminous Asphalt Concrete.” It is also known as “hot mix asphalt (HMA),” or “flexible pavement.” Asphalt is a mixture of aggregates and hot asphalt cement that, when placed, compacted and subsequently cooled, becomes the familiar asphalt pavement.

**Asphalt Binder** — A near-liquid petroleum byproduct used to “glue” the pavement together. By volume, this material makes up about 4–8% of the pavement mixture. (Aggregates make up the other 92–96%.)

**Asphalt Cement** — See “Asphalt Binder” above.

**Asphalt Concrete** — See definition of “Asphalt” above.

**Asphalt Mix Design** — An asphalt mix design is basically the recipe that sets forth what aggregate to use, what size range of aggregate to use, what asphalt binder to use, and what the best combination of these ingredients would be. The asphalt plant that produces the hot mix asphalt follows a mix design.

**Blacktop** — Common “slang” term for asphalt. This term should not be used in requesting any specifications or work, as the term has a broad variety of meanings in different contexts.

**Chip Seal** — A process of applying a layer of hot asphalt oil over existing pavement, then immediately covering the oil with a thin layer of small crushed aggregate. The aggregate is then “rolled in” using a pneumatic (rubber-tire) roller. Chip seals generally are not used on parking facilities because the oil might “bleed” and cause tracking in hot weather, but chip seals are often used on roads that experience low traffic volume.

**Cold In Place Recycling (CIPR or CIR)** — Cold in place recycling is a process where a machine grinds existing asphalt and base to a specified depth, then uses that ground-up material in the same location, creating a new base for a hot mix asphalt pavement. The recycled material is then compacted prior to paving. Often additives such as emulsions or foamed asphalt are added to the ground-up material to improve its stability.

**Concrete** — The common name for “Portland Cement Concrete Pavement.” A hard, compact building material formed when a mixture of cement, sand, gravel, and water dries. Typically used for sidewalks, curbs, and areas such as delivery docks, garbage pickups, or bus lanes that handle heavy vehicles.

**Core Testing** — A method of examining a constructed asphalt pavement to determine its depth and makeup.

**Crack Routing** — Crack routing requires the use of a special piece of equipment that follows the crack and creates a clean reservoir to accept the crack sealing material. Cracks can be sealed without routing (following cleaning with a heat lance), but research has proven that crack repairs that are first “opened up” with a router will last longer and are more effective at keeping water out of the pavement base and subbase.

**Density** — Asphalt pavements are constructed and compacted to a specific density as set forth in a contract or bid specifications by mechanically compacting (rolling) the hot material after it has been placed by the paving equipment. Density is not the same as compaction; density is achieved by compaction.

**Drainage** — A system of drains and pipes for carrying away surface water. An asphalt surface is sloped to maximize the removal of surface water for vehicular safety. Also, the better drainage a pavement has, the less likely water will seep down into its base.

**Edge Milling** — Removing existing asphalt to a specific depth for the overlay, using equipment with a grinding drum.

**Emulsion** — A mechanically produced combination of ingredients that do not normally mix. For example, asphalt emulsions are made by a procedure that mechanically mills the warm asphalt into microscopic globules, dispersing them in water, and adding a small amount of an emulsifying agent.

**Fall** — See “Slope” below.

**Fog Seal** — The process of applying a highly diluted asphalt emulsion in a fine spray (fog) to a roadway surface. Fog seals restore blackness and seal hairline cracks, and there is evidence that they help slow or even prevent oxidation. Not generally used for parking facilities due to tracking.

**Geotextiles** — The technical generic name for fabric-like materials used in the paving process. Geotextiles are manufactured with specific performance characteristics for specific uses such as stabilization of base material to prevent migration into sub-grades.

**Grade** — The degree to which a surface is angled to aid in the drainage of water, the act of leveling or sloping the subgrade or base layer before paving. See “Slope” below.

**Heat Lance** — Device using a combination of propane and compressed air ignited in a specially designed chamber to produce an extremely hot, directed high-velocity stream of air. Used to remove debris and vegetation from pavement cracks prior to sealing. A heat lance also warms and dries the crack so it better accepts the sealant. Federal research (SHRP H-106) has shown that, when used properly, a heat lance is the most effective preparation method for crack repair. Although more expensive initially, preparing cracks using a combination of routing and a heat lance can provide 10 times the life of conventional crack sealing methods.

**Joints** — An asphalt joint is the area where two different “pulls” of asphalt paving meet. For example, if two 8-foot-wide lanes are paved side by side, the joint runs the length of the two lanes. This area is usually highly visible after the paving operation and is sometimes referred to as a “seam.”

**Non-wear lift** — Non-wearing course is typically the bituminous mixture below the wearing course or driving surface. Non-wear mixtures include base, level and binder courses. In Superpave (Gyrarory) design, non-wearing course is defined as mixture below the top four inches of pavement. Local governments can modify the Superpave (Gyrarory) definition to define non-wear as mixture below the top three inches of pavement.

**Nuclear Density** — Measuring the density of a previously placed material achieved by using a special instrument designed to measure the penetration of radiation into that material.

**Reclaimed Asphalt Pavement (RAP)** — Most commonly refers to ground asphalt which is added back into a virgin asphalt mixture at the mixing plant. This and related procedures using RAP are becoming common for economical and environmental reasons. Pavements containing RAP might have different performance characteristics than conventional mixtures. Larger contracts today should specify if the use of RAP materials is encouraged, allowed, or prohibited.

**Reflective Cracking** — Reflective cracking refers to cracks in an asphalt overlay caused by cracks in the original pavement “reflecting” up through the overlay. Specialized techniques and materials, such as multi-membrane paving fabrics, help reduce this problem.

**Slope** — The degree to which a paved surface is angled to aid in the drainage of water.

**Slurry Seal** — A high-tech pavement maintenance resurfacing process generally used on streets and roadways. In this process the slurry seal coating is manufactured by the application equipment as it is being applied. A closely specified blend of graded asphalt emulsion, additives, and aggregate, slurry seal is generally classified as Type I, II, or III depending on the size of aggregate used. (A large aggregate slurry seal with additional polymers may also be referred to as microsurfacing.) Rarely used on parking areas due to the potential for tracking in hot weather.

**Soil Correction** — In some situations the condition of the soil (subgrade) that will support the pavement is unsuitable for paving. The soil might be too wet or might simply be unstable so it needs to be treated with lime or with a cement mixture to add strength to create a solid foundation on which to pave.

**Subgrade** — The soil prepared to support a structure or a pavement system. It is the foundation for the “pavement structure.”

**Subgrade Failure** — Subgrade failures occur when the prepared soil beneath the asphalt structure can no longer adequately support the weight of the pavement or traffic. Subgrade failures can occur for a number of reasons, including: ground water, too much weight, and inadequate design. The failure can be corrected by excavating the soft material from the affected area and replacing it with compacted base rock or lime/cement treated base. See “Patch Paving” above.

**Superpave** — Short for “Superior Performing Asphalt Pavement,” it is an asphalt design philosophy that uniquely designs roads, parking lots and other asphalt structures according to the environment in which they will be constructed. Variables such as weather, the amount of traffic, the type of traffic, etc. are taken into account.

**Tack Coat** — Asphalt oil, usually an emulsion type, applied to existing pavement during repairs or prior to overlay paving to create a bond between the old and new asphalt.

**Tracking** — The result of products or materials being “picked up” by car tires, shoes, shopping cart wheels, etc. and being carried, or “tracked,” from the pavement onto surfaces where the material is not desired. More a concern for parking lots than roads.

**Traffic Index Rating** — A measurement of the amount of traffic a roadway or other asphalt surface is experiencing.

**Transverse Crack** — A break in the asphalt pavement that is at a 90 degree angle to the direction of the roadway or the direction in which the asphalt was laid.

**Transverse Joint** — A joint in the asphalt pavement that is at a 90 degree angle to the direction of the roadway or the direction in which the asphalt was laid.

**Wear Lift** — Wearing course is typically the bituminous mixture used for the driving surface. In Superpave® (Gyratory) design, wearing course is defined as mixture within four inches of the surface. Local governments can modify the Superpave® (Gyratory) definition to define as mixture within three inches of the surface.



## A Business Owner's Handbook

This guide is intended to be a resource for you so you can make informed, educated decisions about pavement maintenance and construction techniques. If you need more clarification or if you'd like more information on specific areas related to your pavement surface, please contact us at:

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