

## Reconstruction of Asphalt Pavement Systems: Proper Planning, Budgeting and Methods are Essential

By Andrew Amorosi, PE, RS

As the roadways, parking areas and driveways of a community age they will require increased maintenance and repair. For financial planning purposes, the useful life of an asphalt pavement system in New Jersey is fifteen (15) years, but “the facts on the ground” may differ; that is, the actual useful life of a pavement system varies based upon many factors, such as:

- Asphalt thickness
  - Subgrade conditions
  - Surface porosity
  - Existing drainage conditions
- all of which must be considered in the determination of the current economic useful life of a pavement system. While the initial useful life used in the Association’s reserve funding analysis may indicate a particular remaining useful life, at any point in time, the actual remaining economic life, in reality, may be much lower. How is this possible?

Based on the pavement system’s current actual physical condition, deterioration may have occurred to the point that repair or replacement is required much sooner than the indications of a potentially outdated reserve study. Because of the economic and physical significance of pavement systems, it is extremely important for Associations to conduct pavement condition assessments and adjust their reserves to reflect the pavement’s current condition. This article is intended to provide Associations with some basic information as guidance for this process, including:

- Causes of Pavement Deterioration
- The Importance of Analysis of Pavement Conditions
- Issues to Consider for a Successful Pavement Repair/ Reconstruction Project.



### Causes of Pavement Deterioration

Pavement deterioration accelerates over time. **The worst enemy of aging pavement is water that enters the surface voids, cracks and failure areas.** When this happens, the presence of water can substantially weaken the structural capacity of the pavement by causing existing cracks to widen (one visible manifestation of this is the formation of “potholes”). The freeze/thaw cycles of winter months will play havoc with these failures because of the expansion and contraction of the water as it turns from ice to liquid.

Accordingly, severe winters are much more damaging to pavement—even if not always visible on the surface. Inadequate subgrade material or subgrade drainage will increase the severity and acceleration of the failures. In addition, deficiencies in pavement thickness and/or subgrade strength will cause premature failures from constant or increased loading (created by normal occurrences such as parked vehicles, garbage trucks, etc.)

### The Importance of Analysis of Pavement Conditions

The early detection and repair of  
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## ***Pavement Systems continued...***

pavement failure is, without doubt, the most important task for extending the economic life of a pavement system. Surface cracks and other failures, which may be minimal, may develop into more costly defects, if not properly repaired in a timely fashion. The best way to ensure this occurs, is for the Community to have its pavement inspected on a yearly basis to:

- Document failures
- Determine their possible causes
- Identify potential repair solutions.

As Associations embark on pavement reconstruction projects, it is necessary to determine the cause or causes of any failures or drainage problems and perform effective repairs prior to reconstruction, as well as, ensure that the viability of the anticipated repair strategy. Pavement cores should be taken from the existing pavement section to ensure it is adequate to support the construction equipment including, milling equipment. If the section is thin, alternate methods of repair and construction will be needed. Heavy construction equipment on an inadequate pavement section can result in significant pavement failures and the need for additional subgrade repairs, with corresponding potential for:

- Substantial increases in construction costs
- Work stoppage
- A Community full of irate residents.

These circumstances can be prevented through proper planning and engineering. Any project involving pavements can be expected to involve great complexity, potential quality of life disruptions to residents and significant capital investment. Accordingly, Communities should ensure that a complete set of construction plans and specifications is designed to ensure proper methods and materials are used.

Engineers with expertise in pavement projects can assist Communities by properly identifying the cause of the problem(s), analyzing pavement conditions and recommending an appropriate repair strategy. This approach is essential to ensure the best use of the Community's available funds.

### **Issues to Consider for a Successful Pavement Repair/Reconstruction Project**

Repairs must be made prior to the surface overlay, which will not only correct the existing damage or deficiencies, but will also prevent or reduce their recurrence. Conditions such as poor subgrade, pavement cracks or failures, if left un- or inadequately repaired, will rapidly recur on the overlay surface (a condition which is known as reflective cracking).

**Specification and budgeting for proper repairs to all areas of failure is essential.** Surface failure (top layer) or full depth failure should be documented and quantified along with an appropriately designed repair. Installing an asphalt overlay on unstable (cracked or otherwise) pavement will result in the

same condition re-appearing in short order. Pavement cracks must also be repaired or treated prior to the overlay for the same reasons. There are synthetic fabrics available to treat smaller surface cracks to reduce the possibility of reflection. Unfortunately, poor subgrade is generally not detectible from visual inspection, and as such, repairs and crack treatments are not effective in these situations. Short of reconstruction of the pavement from the subgrade up to the surface, these conditions cannot be eliminated and some reflective cracking should always be expected.

Surface or subsurface drainage repairs should be performed during this repair phase. Excavations and trenching required for drainage improvements are logically and most cost-effectively completed prior to the overlay installation. Field survey and inspections after rain events can determine the most deficient drainage areas. It should be expected that areas of ponding in the pavement surface will remain unless additional drainage improvements are installed. Field survey (in contrast with simple visual inspection) is important because in some instances the existing pavement is, or appears to be, draining because the cracks in the pavement allow for the water to drain through the openings. Therefore, it would be prudent to consider the inclusion of a budget for drainage improvements.

The thickness of the new overlay material is also important in reducing the reflective cracking; the thicker the section, the less is the likelihood of early reflection. While one and half inches should be the absolute minimum thickness specified for a surface overlay, two inches or more is preferable. The thickness to be used should be increased as site/project-specific conditions warrant.

Milling or grinding the pavement is often specified to remove surface failure, to ensure positive surface drainage or to maintain curb reveal. Frequently however, the installation of an asphalt overlay will result in poor drainage, especially at locations of:

- Garage slabs
- Depressed curbs
- Drainage pipe discharges through curbs.

As stated earlier, it is critical to ensure that the existing pavement sections are adequate to support the equipment that performs this work. High or low points in the surface can be reduced or eliminated by profile milling. As in the case of other aspects of this process, the reconstruction program should consider these conditions by budgeting for, and preparing a proper milling plan.

In addition to the technical considerations, there are many "human factors" of a pavement reconstruction project that need to be carefully considered. While arguably the most tedious facet of these projects is the planning of the actual work, the importance of logistics management and communication should not be underestimated. Resident notification, vehicle movements, garbage collection, mail delivery and school bus activity should be

properly evaluated with alternate plans considered for viability and safety impacts. Unlike paving a highway, the primary pavement sections in many communities consist of parking areas that can be time consuming to work in and contractor production may be limited. Lack of consideration of this situation along with ineffective planning can result in extreme inconvenience to the residents and added aggravation for all involved. It is vital that these issues be considered and for the Community to receive, and be able to live with, realistic production goals established for each workday. This includes a timely and consistent communication process to ensure that Community residents and Management are properly and continually notified of the project's status and its impact on their daily routine.

### Taking "the Right Road..."

All of the above issues affect the costs and outcomes of this type of project. Therefore, it is crucial that Associations properly fund their reserves for the inevitable necessity of properly completed pavement reconstruction projects. Each community will have

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unique circumstances to consider, and reconstruction costs will vary greatly based upon the components of the Community's original roadway construction. Accordingly, a proper, Community-specific assessment should be conducted well in advance of the project to ensure adequate funds are being reserved. A well-considered reconstruction strategy, accompanied by detailed and accurate design plans and bid documents are all essential to the success of these highly visible and complex projects. Proper repair, construction and logistics procedures and methods will need to be delineated and all project materials and work performance must be inspected. Finally, as with any construction project, experienced professionals and qualified contractors are essential in achieving a quality final product, which maximizes its useful life, for the Community.

## **TRANSITION: From Developer to You—The Basics**

By William Pyznar, PE

**transition** *n* 1. a) a passing from one condition, form, stage, activity, place, etc. to another b) the period of such passing.

Transition, to Community Associations, represents a time and series of processes in which the Developer passes ownership, governance and management responsibility to the Association. Transition is a time when the Association has the opportunity to uncover potential construction deficiencies before they become the complete responsibility of the Association. Transition is the time for the Association to assure that they are getting an acceptable "product" from the Developer, and ensure that they are on the right track for funding future required capital replacements. Transition is a time for discovery of potential issues which evolved during the planning and construction phases leading up to the transfer of responsibility to the Association, and a time for resolution of these issues. If the transition has been thoroughly and properly executed with outstanding issues resolved to the parties' mutual satisfaction, then a successful transition should allow the Association to become independent of the Developer's support and "mature" into ongoing governance by the Association's unit owners. The transition process deals with the transfer of common and limited common elements. The common elements and limited common elements are described in the governing documents for each Community,

and the Community has the responsibility for their maintenance and replacement. Other items that do not fall into one of the two above categories may be the responsibility of the individual unit owner. These issues must be addressed through individual pursuit of the Developer and the homeowner warranty. Examples of such issues left to resolution between individual unit owners and the developer are generally interior finishes, squeaks, small (cosmetic) cracks, HVAC systems, etc. However, every Community is different, and the common elements and limited common elements will vary based upon the Association's specific governing documents. All problems should be brought to the attention of the transition engineer, via the engineer's *resident questionnaire* or otherwise, so that potentially large deficiencies may be discovered while still minor. The remainder of this article discusses some of the "roles and resources" which can help to facilitate a smooth and effective transition from the Developer to the Association.

### **The Board of Directors**

The composition of the Board of Directors of a Community is established in different ways. The Developer initially staffs the Board of Directors. Through the transition process, the Board of Directors becomes composed of the unit owners. These new Board Members are challenged with the duty of representing the best interests of the Association.

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## TRANSITION *continued...*

(See *CAI-GAP Report #3 Transition from Developer Control, Second Edition*, for further information and process of board establishment).

### Professional Assistance

To assure that a Community is properly represented with the necessary tools, knowledge and resources that are available to it, the Association should retain the services of a qualified and experienced Management Company, Accountant, Attorney and Engineer. With the assistance of the Association's Manager, the public offering statement (POS), governing documents, site plans, architectural plans, municipal resolutions, bond release information, operational policies, financial information, repair information and everyday occurrences of complaints, problems and events should be collected and made available for review by these professionals. Through the review and reporting by each respective individual professional, the Association will be guided towards proper transition processes.

Once all information has been gathered, the next step of the process is to have the engineer begin to review the documents, conduct inspections of the common elements and prepare an engineering report. This report should identify the 'typical' deviations from the proposed construction and any construction deficiencies as may be visible, and suggest additional investigative work or evaluation, depending on the existing conditions. The engineering report should also provide recommendations for the Association, as a guide to remedying the discovered deficiencies.

The accountant's report will address issues such as whether the Developer has paid all required maintenance assessments. The accountant will review the capital reserve study (discussed below) provided by the engineer, regarding whether all funds were properly collected at closing and accounted for, and evaluate the operating balances and expenses. Again, the Developer and attorney will review the reports and seek resolution of any deficient circumstances or possible discrepancies.

Another portion of the engineering reporting should be the preparation of a *Capital Reserve Study*. Reserves are the "financial fuel" to keep a Community in prime condition. Proper reserve funding not only increases a Community's value by allowing for timely replacement and repair of the common elements, but it also avoids large, untimely assessments to the residents. The Developer is responsible for providing initial funding for the Community while it is still under the Developer's control. A capital reserve study prepared by an engineer provides a basis for comparison of the adequacy of the initial funding to the actual funding required, based upon the existing construction.

Every development has specific circumstances and

considerations associated with its development and maintenance, and the reconstruction or repair efforts of common elements of that development should be equally specific.

**There are no 'typical' costs associated with the replacement of common elements. Every project is unique and should be treated as such. Current replacement costs for each reserved item should be provided in the Capital Reserve Fund Analysis.**

After review of the reports by the Association and their Attorney, the issues are presented to the Developer for remedy. The steps to follow include:

- Reviewing the potential problems that can occur from deficient construction
- Reviewing the costs to correct the issues
- Discussing the means, methods and solutions with the Developer.

On-site meetings and correspondence between the Developer, the Attorney and the Engineer generally follow as problems are resolved. Continued communication and cooperation is paramount in resolving the transitional issues effectively.

### Summary

Transition is a process. When properly completed it will benefit the individual homeowners, and the Community as a whole. When shortcuts are taken, or issues are not properly pursued, the Community will be faced with hardship in the future. A smooth transition will benefit both the Developer and the owner. Cooperative efforts of both parties can result in a well-run Association, with well-planned finances, and a Community that is well-positioned for the future.

## What's New?

### CONGRATULATIONS TO:

**Anthony Volpe** and **Heather Shatzel**—on passing the *Fundamentals in Engineering Exam*; additionally, Heather will soon complete her Masters in Architectural Engineering.

**Leanne Walters** and husband Justin—on the birth of a son.

### WELCOME TO:

**Cathy Maxemchuk**—on joining our Architecture division from the University of California at Berkley; for the past three years she was with a California Architectural Firm.

**Thomas Vidnansky**—on joining our Engineering division as project manager.

### ...AND WELCOME BACK TO:

**Carisa Butensky**—who has returned from her Architecture Study in Italy.