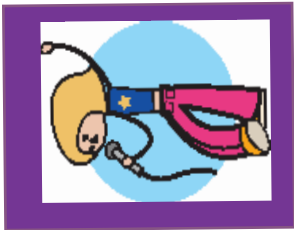


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# The Asphalt RAP

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**Colorado Asphalt Pavement Association**



## Potholes, Causes and Traditional Repair Methods



Asphalt mat failure under repeated loading when the subgrade has failed (Above)

### Mechanics of Pothole Formation

The Hole Story®, potholes are caused by traffic, loading, water/snow/ice, age, and deferred maintenance.

Potholes are created when the pavement or the material beneath it - called the base or subbase - cannot support the weight of the traffic it carries. Two factors are always present in such a failure: Traffic and Water.

Pavement bends under vehicle weight the bottom layer of pavement stretches and cracks. Continued bending fatigues pavement causing cracks on surface.

Water then enters cracks from rain or snow and then freezes. Freezing moisture expands cracks breaking apart pavement allowing water to enter the base and subgrade. The subgrade then loses its

supporting capability and the area falls apart.

Preventing the Problem. In the final analysis good design, high quality materials, and continuous maintenance can substantially prolong the life of pavements and minimize the emergence of potholes.

Water infiltration accelerates the cracked pavement problem. In cold-climates, the deterioration process is further accelerated due to the freeze-thaw action. Methods of Pothole Patching.

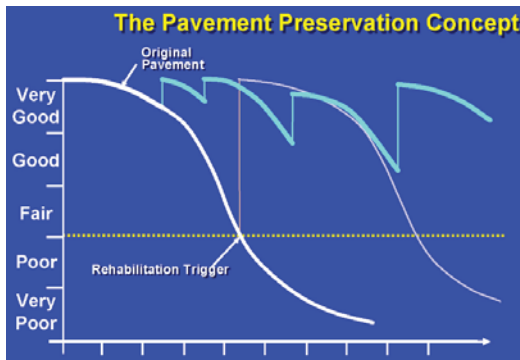
Facing the squeeze of increased costs, less revenue, and citizen resistance to tax increases, many state and local

Potholes are created when the pavement or the material beneath it cannot support the weight of the traffic it carries.

governments have chosen to make "low profile" or "painless" budget cuts. One way to trim operating budgets is to defer preventive maintenance procedures on streets and highways.

Research and field experience have repeatedly shown that over the long run maintaining good roads in good condition costs substantially less per year than allowing them to deteriorate to the point that major rehabilitation or reconstruction is required.

There are three types of pavement maintenance conditions to consider. First would be permanent pavement in good condition, with relative long life remaining and or an Agency budget sufficient to allow permanent patching. The Second would be semi-permanent



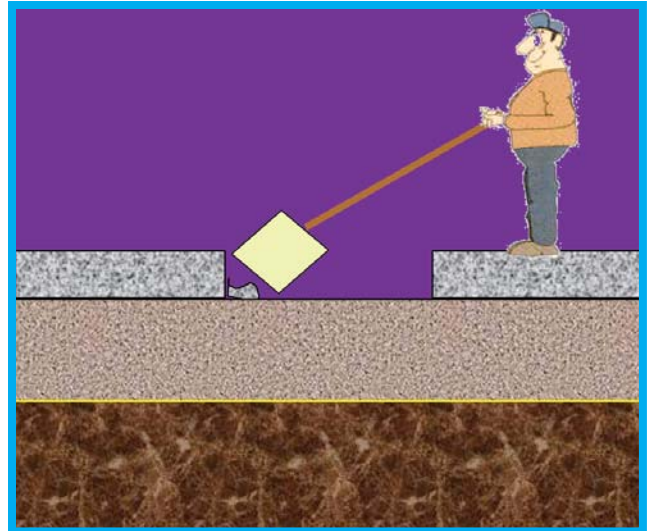
maintenance operations to get through a time period or until a permanent operation can be applied. And the third would be temporary when you know it will be replaced in a relatively short period of time, utilizing a non-permanent material.

**DO THE JOB RIGHT  
THE FIRST TIME**

### Permanent Patch Procedures.

- Safety, Temporary signing in accordance with Part IV MUTCD.
- Mark area of patch. Make sure to

## ASPHALT THE SMOOTH QUIET RIDE



include all areas that are cracked. Marked area should be rectangular in nature. Aids in proper compaction of patch.

- Remove ALL the cracked and deteriorated pavement within the delineated area.
- All pavement cuts should be made vertical and through the pavement structure.
- Remove and replace bad base material with compactable non-saturated material and compact to the proper density
- Remove and replace bad subgrade and compact to the proper density.
- Make sure the prepared area is dry.
- Tack the prepared area to receive the Hot Mix Asphalt, Bottom, Sides. Usually a CSS-1h emulsified binder is used.

**W**hat to avoid when filling the prepared area.



## Potholes, Causes and Traditional Repair Methods

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Marking a repair area

- Throw HMA into the prepared area - i.e. "broadcasting"
- Raking of HMA into the prepared area cold HMA -- will not compact adequately.
- Fill the prepared area with HMA. place the HMA in the center of the area, push or rake HMA to the sides, not over 6" deep.
- Do in two lifts, Compact first lift to the proper density, bump the HMA to the edge of the hole - do not have material outside the patch area.
- Place enough HMA in the patch to compensate for the roll down (compaction - 1/4" per inch of depth).



A Pothole forming in a city street



Rutting and Slippage in a city street

- Compacting the HMA patch. Use a compactor that fits the size of the patch. Finished patch should be 1/8" to 1/4" above the existing pavement -- traffic will provide additional compaction. Do not hump up HMA, humping will jar traffic, vehicles will beat the patch out.

Preservation and Asset Management won't bring short-term glory, but they will bring long-term satisfaction!



Saw cutting a repair area

The delay in rehabilitation, combined with the lower cost of preventative maintenance treatments, can result in dramatic costs over the life cycle of the pavement.



## The Results of Inadequate Roadway Funding

When Agencies cannot do the right repair at the right time, a worst first approach is taken. Repair costs increase tremendously, this will cause the black eye effect.

There are other aspects to consider, especially when thinking of long-term cost savings and the first-blush appearance of your property when a visitor or tenant drives up.

When maintenance priorities are developed for properties, upkeep of the asphalt pavements are often at the bottom of the list. In many instances, pavement maintenance is usually delayed to the point where it's no longer serviceable and in need of reconstruction, resulting in a much higher expense than would have been needed with proper care.



The delay in rehabilitation, combined with the lower cost of preventative maintenance treatments, can result in dramatic costs over the life cycle of the pavement. Other benefits of a preventative-maintenance program include:

- Higher overall performance of the asphalt pavements.
- The ability to make better, more informed decisions on an objective basis.
- The more appropriate use of maintenance techniques.
- Improved pavement condition over time. Reduced overall costs for maintenance of the facilities pavements.

This edition of "The Asphalt RAP" was authored by Thomas Clayton, SET., Director of Training CAPA/RMAEC.

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