

RUBBLIZATION - ASPHALT'S ANSWER TO DETERIORATED CONCRETE PAVEMENTS

Questions and Answers

Rubblization is a road-user-friendly construction technique that turns a deteriorated concrete road into the base for a smooth, safe, quiet, durable pavement constructed of Hot Mix Asphalt (HMA). It minimizes delays for motorists and allows for construction during "off-peak" hours. Rubblization with asphalt overlay is a very cost-effective technique.

What is rubblization?

Rubblization is an effective means of rehabilitating deteriorated Portland Cement Concrete (PCC) pavement. The concrete is broken into pieces, and then it is overlaid with Hot Mix Asphalt (HMA).

Why rubblize concrete?

Fracturing the concrete into small pieces (2 to 6 inches, for the most part) reduces the likelihood that joints, cracks, and other defects in the concrete will "reflect through" the HMA overlay and impair performance. It is also a rapid means of concrete rehabilitation. Contractors report production rates of up to one mile per day.

What are the benefits of rubblization?

Time savings. Rubblization is a natural choice when time is of the essence because it can be done very quickly. If needed, the work can be accomplished at off-peak hours, without the round-the-clock road closures required to cure concrete pavements.

Cost savings. Rubblization with an asphalt overlay is very inexpensive compared to other options. When the cost of delays to road users is considered, the savings become even more dramatic.

Environmental benefits. The rubblized roadbed is left in place, so that it does not have to be trucked off to a landfill. This not only saves landfill space, it eliminates many trips by trucks, saving diesel fuel and reducing traffic congestion.

Smoothness. The new asphalt pavement that is placed over the rubblized roadbed will remain smooth for years.

How is rubblization done?

In general, there are two types of equipment used for rubblization. Multiple head breakers utilize a number of large hammers which pound on the pavement surface. Resonant breakers have vibrating hammers which use a combination of force and vibration to break up the concrete. Next, rollers are used to further break the concrete and seat it into place. This is followed by the placement of an asphalt overlay.

When should rubblization be done?

It is generally thought that rubblization of concrete with an asphalt overlay is most economical when one of the following conditions exists in the concrete surface:

- Patching of 10 percent or more of the slabs.
- Severe D-cracking.
- Severe alkali-silica reaction (ASR) cracking.
- Faulting continues to occur in spite of corrective actions.

In addition, the economic impact of delays to road users during construction should be considered. Rubblization and asphalt overlay can be accomplished speedily.

Are there any problems with rubblization?

In a very few instances, wet soils may soften during the rubblization process. If this happens, provisions should be made so that the fracturing process is adjusted to result in slightly larger pieces of concrete (12 to 18 inches) through the soft area. This is then followed by the normal procedure of rolling and overlay placement. A good engineering investigation will identify these areas so that they may be corrected by proper drainage before construction even begins.

Is rubblization effective?

A 1992 paper by Witzcak and Rada in the Transportation Research Record (TRR) states, "Rubblization of deteriorating PCC pavements followed by an AC [asphalt concrete] overlay is an excellent rehabilitation method that is equally effective for all types of existing PCC pavements. This technique is the preferred rehabilitation method for all types of PCC pavements." In an award-winning 1999 article in TRR, Thompson documents the success of rubblization in Illinois noting that it is a "viable and cost-effective rehabilitation option." Currently, more than half the state Departments of Transportation have implemented specifications for rubblization. The state of Arkansas has embarked on a five-year program to rubblize approximately 360 miles of four-lane concrete Interstate highways. The preponderance of favorable research findings and practical experience clearly indicates the value gained by rubblization of concrete pavement and overlaying it with HMA.

Conclusions

- Rubblization is an effective method of pavement rehabilitation when overlaying a deteriorated concrete pavement with HMA. It ensures pavement performance by preventing defects in the concrete from reflecting through the HMA surface.
- Rubblization combined with an asphalt overlay can be done rapidly, minimizing delays for motorists.
- Rubblizing and overlaying with asphalt is economical, making it attractive to public agencies who wish to use resources wisely.
- Once the asphalt surface has performed its many years of service, it may be milled up and recycled into a new surface, or it may simply be overlaid, taking advantage of the pavement already in place.
- Researchers have concluded that rubblization is a technically sound approach, and many highway agencies have had great success in implementing it.

Rubblization saves nonrenewable natural resources for future generations.