

Take the green approach; why replace it when you can restore it?

Catch-basins- A necessary evil

Maintenance people hate them, property managers love them since they provide a level of protection against water-ingress, and the damage that will inevitably follow, but they are essential objects in any property owner's portfolio.

When catch-basins work well they are almost forgotten, but when they fail, the financial impact due to loss or liability is normally high. So how did we get from this?



This photo shows that longitudinal damage has already started under the surface. Radial cracks indicate that general subsidence has already begun. Simple patching, as was done on this catch-basin, does not address the underlying problem of a faulty seal around the annulus of the basin.

To this:



This sink-hole was caused by a faulty longitudinal joint between pavement and shoulder, but the end-result is the same: Fines were washed away under the pavement surface, mechanical strength of the base was compromised, and a hole appeared under a point-load!

The answer is simple: **Regular maintenance**

Catch-basins, by their very nature, are located so that the maximum effective drainage can take place from surrounding areas and that means a lot of water will pass through them. They are normally about 4 ft. deep and the base sits on un-compacted gravel which has usually been disturbed by construction. Damage to the drainage system, starts when the asphalt pavement seal around the top of the basin starts to deteriorate, either due to

age, mechanical loading, binder-stripping or simply mechanical displacement such as snow-clearing.

When these factors result in water by-passing the catch-basin grid and running down the side of the basin. Some catch-basin designs have a built-in filter to try to encourage water to re-enter the basin below the surface, but this is somewhat of a double-edged sword in that in a poorly maintained catch basin, the water-level can be higher than the filter and out-flow takes place instead, increasing the amount of bypass and aggravating the loss of fines.

Natural drainage of water down to underground streams or rivulets or aquifers occurs naturally all around the catch basin, but when the amount of water is increased many times, as happens with faulty catch-basins, the flow-rate increases and the fine particles, which provide the “glue” which holds the coarser material together, are leached away. This coarser material provides the mechanical strength which supports the roadway above, as well as the base of the catch-basin. Without the glue to keep the coarse material in shape, the coarse material tends to agglomerate vertically downwards and subsidence of the surrounding material starts to take place. Initially the compacted base under the black-top, as well as the black-top itself provides a “platform” for the pavement surface, but concentric rings will appear around the catch-basin lid as the basin itself sinks. At a certain point the outlet pipe from the catch basin starts to leak, or is ruptured and accelerated degradation will occur since a lot of the fines are simply carried away by the remains of the ruptured outlet ducts. Advanced ruptures will show longitudinal lines of subsidence directly above the outlet pipes and the repair costs will start to mount at this point.

The degree of subsidence is largely determined by soil composition and the degree of sub-surface compaction. Very fine soils, like clays, have very little mechanical strength and are far more prone to loss of fines and it is in these locations that catastrophic sink-holes will occur. The pavement itself and the compacted sub-base provide a certain amount of cantilevered strength, but it is usually a heavier point-load, such as a fork-lift, or truck, or construction equipment which suddenly exposes a break-through, and they tend to be more expensive a carry liability due to injury as well!!

Regular maintenance of catch-basins is cheap and easy and should form part of your asphalt pavement maintenance as follows:

- *Check for water accumulation after every rain-storm*
- *Lift the lid after every storm and check/empty the debris trap*
- *Check for correct protrusion above pavement, adjust to correct height*
- *Check the pavement seal around the metal ring of the catch basin*
- *Look for concentric cracks around the catch basin. Take action immediately if required!*
- *Look for longitudinal cracks in the pavement between sequential catch-basins*
- *Take controlled remedial action, don't let emergencies dictate your actions*

