

## INFORMATION SHEET

March 2015



The following series of photographs show the construction of what is now a busy road in Phnom Penh, Cambodia. (Phnom Penh is the capital and largest city and is the political, economic, and cultural center of Cambodia).

It is now nearly 15 years since the dirt road was converted to a heavy duty highway and which was sealed with a two coat bitumen emulsion/chip layer.

The road created a short cut to the port and carries constant heavy container traffic to and from the Main International Container Port on the Mekong river.

The road has never required maintenance, a really remarkable fact in view of the short maintenance life of conventional bitumen roads.

Moreover, the initial cost of Firmament roads is a fraction of that of conventional roads.

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The Initial state of the street in Cambodia





Using a grader to work up the soil. Big stones removed



Application of the very dilute Firmament solution.





Consolidation and shaping with 10 tonne roller and grader.





Finished and consolidated Road



Chipseal applied on bitumen cut with diesel





The road in Phnom Penh On the side of the road so you can see what happens when the chipseal surface is not so heavily trafficked. You still can see the stone. The center of the road gets **very heavy container traffic all day** so it has become more compressed and looks more like a traditional hot mix asphalt road. This road was 8 years old when this photos was taken. No repairs have ever been done on this road and we don't expect any for many years. The last report about the state of the road was in S2012 and the road looked much the same as the final 2007 photo except that less rock was visible. This happens with chipseal as the emulsion softens slightly in the hot weather and traffic pushes down the rock making the whole road eventually look like hot mix asphalt. ( It can be assumed that there will be little change as at 2015 ).

[Dr. Duane Ebnet]