



Zero Pollution Cold-Mix for Road Construction

Case Description

One of the major factors contributing to emissions from bitumen road construction and maintenance activities is the hot-mix technology used in laying of road. Conventional method utilising hot-mix technology is energy and emission intensive as it involves on-site heating of bitumen before it is applied in road construction or maintenance. Consumption of diesel in road construction equipment leads to high amount of fine particulate matter pollution, a source whose contributions not examined adequately but is very relevant to curb air pollution from road construction in the country. This is exacerbated by the fact that standards for control of emission in such activities do not exist in India yet. See CII-NITI Report on Clean Industry which recommends emissions from non-road diesel equipment to be considered under CPCB-IV standards which are yet to be notified.

In contrast, 'cold mix' technology does not require on-site heating and diesel consumption for road construction or maintenance activities. Cold mix is bituminous mixture containing unheated mineral aggregate, water, and binder (bitumen emulsion) prepared by a suitable device like concrete mixer or cold mix plant or even a hot mix plant modified for these purposes. Bitumen emulsions are engineered and tailor-made for road applications. To manufacture these, a substantial amount of bitumen is suspended in a finely divided form of the size 4-10 microns in water in the presence of emulsifiers under controlled conditions. Stronger formulations are also available based on modified emulsions using Natural Rubber Latex. By design, these cold-mix emulsions chemically change from a semi-liquid material to a dense cold mix material that is able to carry normal traffic within one hour after application. Bituminous resurfacing material which are usually applied in order to preserve and protect the underlying pavement structure and provide a new driving surface, are also available as cold mixes. Such micro surfacing cold mix emulsions are based on polymer modified asphalt emulsion.

The cold-mix product presented in this case study is developed by CRRRI and registered under the name of BitChem. CRRRI - BitChem Coldmix® product ensures zero pollution to the environment as it requires no

heating of aggregate and binder. It is an energy efficient, eco-friendly and pollution free method of road construction which mitigates air emissions and prevents adverse effect on the health of the workers. Currently, the focus of BitChem is rural roads which constitute the large proportion (60.4%) of the total road network in India. Over the years, cold-mix have gained so much popularity and credibility that it can now overcome the conventional hot mix technology in any application. With thousands of kilometres of roads being constructed every year by National Highway Authority of India, National Rural Roads Development Agency (NRRDA) and State Public Works Departments in India, Cold-mix technology presents an immense opportunity to construct and maintain roads in environmentally sustainable fashion.

Figure: Coldmix process for road construction



Business Model

- Zero waste manufacturing plants at Durgapur and Guwahati with overall production capacity of 7,200 tonne/month and depots across the country
- This technology has been used to lay over 8,500+ kms of Roads in challenging conditions and remote rural areas of India till 2021



Impacts

- As it requires no heating of aggregate and binder thereby **saving 1,500 litres of fuel per km** which is equivalent to 4 tonne CO₂e greenhouse gas emissions
- Certified by Bureau of Indian Standards (BIS) and Central Road Research Institute (CRRl)

Innovation

BitChem is the first and leading coldmix product and only such service provider in India, established in 2008 and based on an indigenous technology developed by CSIR-CRRI.

It ensures overall savings of over 35%, guarantees 200% faster progress per day. This product emits zero pollution, it ensures a substantial reduction in the air emissions with no adverse effect on the health of the workers.

About Pioneer

Website - <https://bitchem.com/>

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Geography

Pan India

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