The Market for Asphalt

The global asphalt/bitumen market is expected to reach 124 million metric tons in 2011 representing an estimated turnover of $74.4 billion. Prices were as low as $115 per metric ton delivered at the refinery in 1999, topping $200 in 2005 rising to more than $600 in the summer of 2 Innovations

Whereas bitumen was used to waterproof boats and buildings in the cities of Babylon and Carthage millennia ago, its properties were also used in early photography since bitumen on pewter plates exposed to light made black and white images. Later it was also applied as sound insulation in computers and home appliances such as white goods. Whereas most of asphalt is mined, it could also be produced from renewable sources such as sugar, molasses, and from starch provided by rice, corn and potatoes. However, today the bulk of bitumen is made from left-over petroleum after refining and from used motor oil. The main
challenge with asphalt remains its massive waste generation since roads need to be repaved regularly due to wear and tear. Asphalt in Europe is today 80% recycled, twice the amount of recycled paper, glass, plastic and aluminum combined. The US Federal Highway Administration estimates that 91 million tons of asphalt are scraped or milled off roads during resurfacing and widening. Of that massive volume 73 million tons are reclaimed. However, this huge volume requires hauling and shipping from the road to reconditioning centers causing additional traffic jams due to the fact recycling and blending of 10 to 25 percent of old asphalt into a new mix is done off site.

Mr. Hisashi Hosokawa pursued a remarkable career as a career service man of the Japanese Ministry of International Trade and Industry (now Economy, Trade and Industry), including the posts as Director General of the International Trade Policy Bureau, and concluding his time with the Government as Vice-Minister for International Affairs. After the mandatory retirement, Mr. Hosokawa took the exceptional step not to be parachuted into a comfortable post within industry or a government agency (known as amakudari), he decided to become an entrepreneur. Since he also held major responsibilities for environment, he reflected on the key industries where he felt that specific innovations could steer the industry towards sustainability. In view of the sheer volume of asphalt, and the challenges the industry faces to upgrade the waste material from regular asphalt to higher grade and better value porous variety he assembled a consortium of Japanese industries and a core group of experts. Starting from an existing technology, he perfected a system that not only is able to recycle asphalt on site, it can even convert the old paving material into the higher quality porous asphalt thus going beyond the mixing 10-25 percent of old material. His proven technology and process only requires blending maximum 30 percent, depending on the asphalt mixture to be repaved, of new material in order to recondition highway cover. He went on to create the Tokyo-based company GreenARM Co. Ltd. to commercialize these solutions. Mr. Hosokawa labelled his approach to asphalt recycling and other industrial designs he is developing as “ecofacturing”, differentiating this methodology from manufacturing.

The First Cash Flow

Mr. Hosokawa and his team at GreenARM including Prof. Atsushi Kasahara, a prominent academic of civil engineering who had initiated the idea advanced rapidly in the design and the manufacturing of a train of equipment and successfully proved the efficacy of the technology with a government project after initial tests in Japan. With an earlier technology a series of probes had been undertaken with porous asphalt in Italy in advance of the Winter Olympics in Torino (Italy) in 2006. GreenARM was also involved in a major first contract with the Public Works Department of Delhi State Government (India) through a local joint-venture in preparation of the Common Wealth Games 2010 recovering 820,000 square meters of resurfacing of city roads. The earlier technology of in situ recycling also demonstrated its superior performance in timing and surface quality, totally rehabilitating the old asphalt.
The NHAI (National Highway Authority of India) has introduced mandatory recycling for road rehabilitation accordingly emphasizing in situ recycling. The train of equipment preheats the surface asphalt mixture, easily scarifying it on the road, reconditions it into the desired mix on site, re-using 100 percent of the reconditioned asphalt and mixing it with a minor portion of new material. The porous asphalt making technology has an additional unit of separating asphalt coated particle by particle size after scarifying and before mixing, and a double paver that lays both porous asphalt and the mortar under-layer in tandem. Using what you have is one of the core principles of the Blue Economy, avoiding transport and securing on-site recycling thus reducing costs and material use. In this case, it is a reduction of material by factor 9. This provides sufficient financial incentives to justify the investments.

The Opportunity
Road construction imposes a heavy toll on the environment. Converting roads to porous ones secures that storm water follows the natural drainage. Aquaplaning is not only dangerous for the drivers, it also impedes the cleaning of water leading through a natural filtration process which leads to the accumulation of waste and toxins on and around the road. Whereas the producers of asphalt/bitumen are a few major multinationals, the road builders are usually local companies that are strongly embedded in the regional business tissue. The shift in equipment required to apply the business model described above implies a fast depreciation of the existing capital investments. Since the equipment typically has a long operational life, this leads to a resistance to change, especially when the machinery is not amortized in full. This creates a window of opportunity for the entrepreneur to make a difference. However, the porous asphalt produced from existing road cover plus a minor addition of fresh material reduces mining and shipping, and helps reestablish the water table. It is a change of the rules of the game that anyone with a sense of risk is prepared to take.

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