Application Story

A Clean Highway is a Safe Highway

In the US, most of the road surfaces are asphalt or concrete and are very smooth, however, in some parts of the world, roads are constructed differently. They use bricks or stone blocks and in Japan, they are starting to use an asphalt that is made up of a larger aggregate. The larger crushed stones make the surface more porous by increasing the space between stones which helps to drain water off the surface to prevent puddling, making the road safer. This is especially important in more mountainous regions because this type of road also helps to control runoff. The larger aggregate and spacing also helps to absorb sound reducing road noise. Thanks to these advantages, this type of road surface is becoming increasingly popular in Japan, but along with these advantages, come some challenges.

Because the road surface is more porous, sand and dirt can clog the space between the stones, so to keep the road operating effectively, maintenance is required.

The road can be cleaned by a staff of workers using pressure washers, but this is time consuming and care must be taken to control flying debris.

To help clean these roads more effectively, a new machine has been created. This machine is a self-contained unit that both cleans and cleans up after itself.

High pressure road cleaner

Underneath the vehicle, in the front, is a long rectangular pad. In the front of that pad, a series of high pressure nozzles create a jet spray of water and tiny air bubbles to loosen the packed dirt. In the back of the pad, a vacuum sucks up the loose sand, dirt and water and holds it in the storage tank section of the vehicle. The final process is a lighter pressure wash to clean any remaining dirt off the surface.

To create the high pressure for the initial and final cleaning, high pressure piston pumps are used. Since the high pressure piston pump only needs to run when the machine is cleaning, an Ogura MMC clutch is used to turn the pumps on and off. The same holds true for the vacuum pump. When the vacuum pump is required to suction up the water and the loose dirt, the Ogura MMC clutch is engaged. When the vehicle is in transit mode, all pumps and vacuum are disengaged.

Ogura MMC clutch

The MMC clutch for both the pump and the blower work the same way. When the 12v coil is energized, an electromagnetic field is created and the armature is pulled against the rotor. The MMC is a double flux design which means that there are two magnetic loops created in the rotor which helps to boost the torque versus a single flux design. The armature is connected to the input hub via a bi-directional spring which in turn is connected to a universal joint shaft. The bidirectional spring is important because there can be some reversing loads, so the bidirectional spring prevents any chance of spring breakage.

Ogura is proud to help keep the roads of Japan clean. Besides this application, MMC clutches are used in the fishing and agricultural industries, pumps and other construction machines.●