

# BEFORE THE RUBBER MEETS THE ROAD



When a large tire and rubber manufacturer in Tennessee decided to undertake a drive retrofit on one of their Banbury mixers, they turned to Yaskawa and Electric Motor Sales (EMS) in Chattanooga, TN, who helped them upgrade to medium voltage drives.

## CHALLENGE

The Banbury mixer's job is to take rubber slabs plus additives like carbon black and others and mix them to make a rubber compound suitable for tires. It is necessary to work the rubber very hard to ensure proper distribution and dispersal of the ingredients. A batch sequence can take from 1 to 10 minutes. Drive loading goes from virtually no load to well in excess of 100% load in every batch.

The manufacturer's mixers had been powered by DC drives for their high torque capability over a wide speed range. Maintenance was an issue, with concerns over forced ventilation, brush wear, commutator maintenance, etc. These issues are exacerbated in the rubber plant with conductive dust like carbon black and vapors in the atmosphere. They can destroy the commutator film and have the potential for arcing.

## SOLUTION

The manufacturer initially decided to retrofit the drives on one mixer, electing to replace the DC drives with medium voltage variable frequency drives.

They created a detailed specification for the project. The application was for two drives and motors, mechanically coupled at the gearbox. The speeds had to be matched and the drives had to be capable of load sharing. The full load torque requirement at the rotor shafts exceeded 200,000 lb-ft.

After close collaboration with Yaskawa engineering, they chose a pair of Yaskawa MV1000 medium voltage drives, 4160V, 375A drives to power 2500HP, 8 pole motors. They were able to source both the drives and motors from EMS.

## RESULTS

After a successful startup, production has not been interrupted and the MV1000 drives are providing excellent torque and speed control with full uptime and no nuisance trips.

The time in production has allowed the manufacturer to quantify a second significant benefit to the retrofit: energy savings. They reported that efficiency analysis of the new drive and motor package has shown a 12-15% efficiency improvement compared with the old DC system. Data available from the MV1000 via its Ethernet/IP communication option made data acquisition simple and straightforward. This data was presented to the local utility authority, who reviewed the data and agreed that the retrofit qualified for their Energy Efficiency Incentive program.

The manufacturer is very pleased with the results of this project, both in the MV1000 performance and the personal collaboration with YAI. They have subsequently used MV1000 drives on 3 additional retrofits.



**The MV1000 is a Medium Voltage (MV) AC drive that takes a generational leap in ease of application and installation. With Yaskawa's Smart Harmonics™ Technology input isolation transformer and 9 level output for 4kV drives (17 level line-to-line), the biggest traditional issues with the application of MV drives all but disappear.**