

## GGB provides custom spherical bearings for Vietnam's Son La project

There are currently four major hydroelectric power projects under construction in northwestern Vietnam, the largest of which is the Son La project. Capable of generating 10.2 billion KWh per year, it will also be the largest in southeast Asia when it goes into operation in 2010.

GGB, formerly Glacier Garlock Bearings, has produced custom, self-aligning spherical bearings for this project based on its DB™ material, which is also available as cylindrical and flanged bearings, thrust washers and sliding plates. The bearings will be installed in the cam rollers in heavy roller gates used for the maintenance of radial gates that control the reservoir level through discharge of water from the dam. Roller gates are



typically used where the openings are too large for slide gates, resulting in lower operating loads and providing for gravity closure.

Hydropower gates open and close only infrequently — at most once or twice a year — but must function reliably and safely when they do. The primary contributors to bearing failure in these gates are dirt and corrosion. With this in mind, GGB Brazil designed custom DB spherical bearings specifically for the application. With outside diameters of 480mm (18.9 in.) and weighing about 400 kg (880 lbs.) each, they are constructed of a corrosion-resistant, stainless steel inner ring and an axially split, seawater-resistant bronze outer ring embedded with solid PTFE lubricant for easy installation. Running-in film over the sliding surface assures instant full-load capacity to minimize stick-slip effect.

### Low-friction, long life

This structure provides ultra-low friction, maximum wear resistance, long service life and absolute corrosion resistance, even in wet, dirty environments. And since they require no additional lubrication, the new bearings are environmentally friendly and totally maintenance-free.

Compare GGB's new spherical bearings with standard offerings that use non-corrosion-resistant bearing or carbon steel rings, with only the sliding surface protected by thin chrome plating. The PTFE sliding liner of these inferior bearings is glued to the outer ring, allowing water to penetrate, corrode the ring and render the bearing inoperable. As a result, these bearings require internal grooves for the addition of lubricant to protect against corrosion and intrusion of abrasive dirt.

When the roller gates open and close, the GGB DB spherical bearings will oscillate on a stationary, stainless steel shaft. For 32m of the 85m round trip, they will be subjected to loads of up to 4,342,900 N with a specific wear rate of 14µm/km. For the remaining 53m, they will be subjected to a lower guide load with a specific wear rate of just 2µm/km.

Based on these wear rates, a specific load of 51.3 MPa, oscillating speed of 0.02m/s and pU factor of 1.1, the estimated service life of the bearings was calculated at more than 500 years.

In addition to its new spherical bearings, GGB recently developed two self-lubricating, fiber/resin composite bearings, HPF™ and HPM™ for bearings for Francis, Kaplan and Pelton turbines, as well as gates and valves. These materials are specifically designed to meet the demands of a wide range of hydropower applications for high load capacity, low friction and wear rate and long service life.

