

—Equipment and Products—

THE STRONGEST HYBRID MAGNET

Claim to the world's strongest magnetic field is now being made in Japan. National Research Institute for Metals reported successful generation of a magnetic field with induction of 36.04 Tesla, beating the previous record of 35.2 Tesla set in MIT, USA. This high magnetic field was generated by a special hybrid magnet located in Tsukuba Science City. The device comprises an electromagnet surrounded by two sets of coils: an inner coil made from copper wire, and an outer coil made from superconducting materials. The outer coil generated the field of 14.04 T, while the inner coil provided a field of 22 T. This field was generated in a space with a diameter of 3 cm. The superconducting coil was wound with Nb-Ti and Nb-Ti-Sn wires while the copper wire used for the inner coil was reinforced with aluminium oxide.

MAGNETIC LINERS

Magnetic ball mill lining plates have been granted two patents and are now in use in more than 100 ball mills in China, at operations such as the iron and gold ore mines. Some of these magnetic lining plates have been in operation for more than three years and excellent results are being claimed. The operating principle of the liners is that particles of ore and of the balls of the grinding media are attracted onto the plates and gradually form a protective layer. The surface of the plates is protected by this layer against direct impact and abrasion. Compared with manganese steel liner plates, magnetic liners offer numerous advantages, including longer life, thinner plates, lighter weight and faster replacement of the liners.

LIFTING MAGNETS FOR STEEL SHIPPING

Boxmag-Rapid supplied battery-powered lifting magnets to a steel shipping company Confill (Midlands) Ltd. Confill regularly load, with a fork lift truck, packs of steel into standard containers for shipping overseas. Boxmag-Rapid specified two battery-operated lifting magnets to be fixed to the telescopic beam of the fork lift truck. The telescopic beam can be adjusted to facilitate the lifting and loading of different sizes of packs of steel.

RARE-EARTH ROLL SEPARATORS FOR TURKEY

Following recent privatisation, Kumas-Kütahaya Magnesit Isletmeri AS (now owned by the Zeytinoglu group) has embarked on a privatisation programme to enhance efficiency of its magnesite ore separation. An order has been placed for

rare earth roll magnetic separator to be supplied by INPROSYS (International Process Systems Inc.). The separators will be used to remove serpentinite from raw magnesite ore. The total combined feed rate to be installed at the processing plant and mine sites is 485 t/h. The INPROSYS High Force separators have the process width of 1.5 m with roll diameter up to 300 mm. Several large diameter roll separators will be used at the Kūmas mine to process 20 to 60 mm ore.

VIBRATION CONTROL USING MAGNETIC FLUIDS

NEC (Japan) has developed a variable-capacity damper which uses a water-based magnetic fluid, and also a semi-active fine vibration control system using a new magnetic fluid. This magnetic fluid allows a semi-active vibration control device which uses continuous change in viscosity to control the damping capacity. It can be applied only to low-frequency vibration under 10 Hz, but can decrease the resonance peaks by 80%. NEC plans to apply it to the micro-gravity environment maintenance equipment used in space experiments.

The semi-active vibration control device is composed of a double cylinder dashboard and electromagnets. The vibration system of the device has changeable parameters permitting control of the damping capacity.

CURRENT DENSITY OF SC WIRE UP BY 20%

Nb-Cu-Sn superconducting wire using a "modified jelly-roll" technique has reportedly supported the current density 20% higher than that possible with conventional superconductors in 10 Tesla magnetic field. The production process developed by Teledyne Wah Chang (TWC) of Albany, Oregon, USA, involves wrapping alternate layers of copper sheet and niobium expanded metal sheet around a tin rod. The "jelly-roll" wire is then inserted into a copper tube and extruded into a hexagonal-shaped wire known as an element. These elements are bundled into another copper tube and extruded into superconducting wire. Tests carried out by the National High Magnetic Field Laboratory at Florida State University revealed an increase in current density of 20% at 10 t. At 20 Tesla current density increased by more than 40%.

SWISS INVEST US\$55M IN SOUTH AFRICAN MAGNET PLANT

A group of Swiss financiers is investing US\$55 million in South Africa's ferrite magnet factory, to be situated in Isithebe in northern KwaZulu/Natal. The project is a joint venture between Swiss Euro-Tech Industries and Thyssen Magnettechnik, the German steel and electrical company which will provide technology and marketing support. Construction of the 30 000 m² factory is under way and production is expected to begin in May 1996. The factory will employ between 400 and 500 people and at its full capacity it will produce 1000 tonnes of magnets per month within the next three years, about 2% of the world supply. Figures indicate that sales at full capacity would be in excess of US\$60 million a year. Investors decided on South Africa because magnets were a labour-intensive product and the price of electricity was low.