

Feature- I : Infrastructure systems – In pursuit of safety and security –

Social-capital Products Contributing to Social Safety and Security

The Kobe Steel group offers various social-capital products such as seawalls, Sabo dams, high corrosion-resistance materials and sound-absorbing panels for reducing noise, each having unique features. These products incorporating advanced technologies for providing social safety and security in the most effective manner have won excellent reputations. This special issue focuses on their technological background to deepen the understanding of these products.

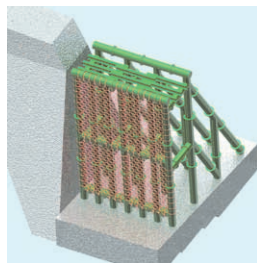


Fig.1 Basic structure of GRID NET™ (open-type grid dam for debris flow composed of small rocks)

Fig.1 shows one of the basic structures of GRID NET™, an open-type steel dam made by Kobe Steel. The structure includes a ring-shaped net (openings: 300mm in diameter) attached on its upstream side. This ring-shaped net can trap debris flow containing rocks smaller than 500mm in diameter without damming up running water, a feature not attainable with the conventional open-type steel dams. This development is expected to broaden the application of open-type steel dams.

Feature- II : Electronic and Electric technologies (Advanced Materials and Apparatuses)

Advanced technologies for materials and apparatuses for electronic and electric components

Electronic and electric technologies are making rapid progress in the environment surrounding us, as seen in the widespread use of IT in our social life and implementation of automatic controls in automobiles. Electronic and electric machines and devices that support this development have become higher in performance, more sophisticated in their functions and smaller in their sizes, requiring increasingly advanced technologies for their materials and manufacturing-related technologies. This special report introduces the activities of Kobe Steel Group Companies, which has a variety of menus for advanced materials and widely contributes in the field of electronic and electric technologies, including the manufacturing of advanced materials as well as evaluation and analysis.

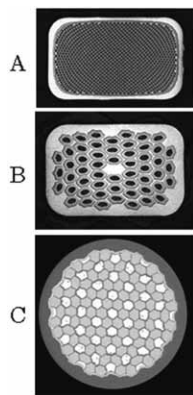


Fig.2 SEM images of Nb₃Sn conductors developed at Kobe Steel
A: bronze routed process,
B: power in tube process,
C: internal tin process (distributed tin process)

Fig.2 shows SEM images of Nb₃Sn conductors developed at Kobe Steel. As a Kobe Steel group company, JASTEC manufactures, as one of its main products, the superconducting magnets for NMR apparatuses for chemical analysis and focuses also on the business of the Nb₃Sn superconductive wires used for this application. NMR has been used mainly in the field of chemistry, including the synthesis of organic compounds; however, with the recent development of biotechnology, the demand for it in the structural analysis of biopolymers has been increasing. Biopolymers have complicated structures with large molecular weights; hence, analyzing their structures requires NMR apparatuses with high resolution. As a result, there is a strong demand for magnets with a high magnetic field. Against this background and with application to superconducting magnets for high-field NMR as a goal, Kobe Steel has tested several superconductive wires made by the bronze-routed process, powder-in-tube process (TS-PIT) and internal tin process (DT).

<Cover photos>

The photo in the bottom right is an open-type steel dam, called GRID NET™, developed originally by Kobe Steel for effectively trapping debris flows. The GRID NET™ is a grid-type dam with mesh of rings and is capable of capturing granules of 500mm or smaller, the granules difficult to be captured conventionally. The photo in the upper left is a sound absorbing panel, named Eco Kyuon™, made of microperforated aluminum, which are highly effective in reducing traffic noise. This product is being widely spread with its lighter and more environmentally friendly nature compared with conventional sound absorbing panels using fiber-based acoustic absorbent. The photo to the upper right shows an NMR superconducting magnet equipped with a recondensed helium cooling system with a small cryocooler, and SEM images of Nb₃Sn conductors (distributed tin process) developed at Kobe Steel. The photo to the lower left shows the base-chamber of model W50-1300S corresponding to a substrate film 1300 mm in width. Kobelco's R2R system is characterized by the "open chamber concept," which provides easy access for maintenance and cleaning up the coating zone and exchanging the sputtering target.

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