

Surge Protection Hall of Fame



Misao Kobayashi
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Designer of the World's First
High Voltage MOV Arrester

Misao Kobayashi has spent his entire 52 year career involved with surge arresters. When he was hired by Meidensha Corporation in April of 1954 little did he know he would be such a significant contributor to the surge protection industry. At 77 he is still an active member of the Japanese technical committees involved in the surge arrester industry.

His first projects on surge arresters for Meidensha involved improvements on the mature Silicon Carbide Gapped Type arrester. In the late 60's after the introduction to the world of MOV technology by the Matsushita Electric Co also of Japan, he took a look at it and decided that if they could do it for low voltage, he and his team could do it for high voltage applications.

In 1975 Meidensha became the first company to introduce a high voltage MOV type arrester.



World's First High Voltage Installation 1975

The units were installed on a 66kV system and put into service at the Hayato substation of



Kyushu Electric Power Co.
That success gave Japanese electric power companies prospects in developing highly reliable power systems and promoted the development and application of the new gapless arrester.

Brief Bio

- Born August 24, 1931, Tokyo, Japan
- Graduated from Tokyo Institute of Technology 1954
- Joined Meidensha in 1954 and worked there in many engineering capacities until 1996
- 1996 to Present Power Systems Consultant in Surge Protection.

Contributions to the Surge Protection Industry

As an actual leader of the project team to develop ZnO gapless arrester at Meidensha, he developed many first of a kind.

- 66/77 kV system arresters which were put into service at Hayato substation of Kyushu Electric Power Co., first in the world.(1975)

Misao Kobayashi

- 500 kV tank type arresters for GIS which reduced the space and cost of 500 kV substation and increase the reliability of electric power systems (1979)
- 500 kV ultra heavy duty gapless arresters for the converter station of Manitoba Hydro in Canada.(1979) There were three heavy duty arresters in parallel close to main transformer as protection for TOV by ferro-resonance)
- 250 kV arresters for DC transmission systems. Consequently, now, 800 kV DC transmission lines are realizing.(1979)
- 154 kV oil-immersed type arresters for shunt reactors.(1980)

Standards Activities

He has been very active, internally and externally, to introduce the new arrester and to establish its standards in order to come into wide use of them in the world.

- He contributed to standardize the MOSA in Japan as a member of technical investigating and standardizing committees of the IEE of Japan.
- He attended a CIGRE WG33.06 (Insulation Co-ordination in AC Systems) meeting in 1977 and IEC TC37 (Surge Arrester) meeting in 1979 proposing to make a new standard. Consequently, TC37 decided to start WG37.04 (MOSA) and IEC 60099-4-1991 was issued.
- He attended IEEE, IEC and CIGRE meetings nearly 100 times during 30 years from 1977 including several WGs, MTs Colloquiums, Symposiums, TFs and Committee Meetings.

Awards

- 1976 Prize of Invention by Japan Invention Society

- 1977 Prize of Progress by Japan Electrical Manufacturer's Association
- 1978 Prize of Progress by IEE of Japan
- 1979 Production Prize by Oukouchi Memorial Association
- 1989 Commendation by the Minister of State for Science and Technology
- 1992 National Medals of Honor with Blue Ribbon by the Prime Minister of Japan

Papers (Relevant for MOSA) Most important papers for the development and promotion of the gapless MOSAs

- (1) M. Kobayashi, M. Mizuno, T. Aizawa, M. Hayashi and K. Mitani, " Development of Zinc Oxide Nonlinear Resistors and Their Application to Gapless Surge Arresters " IEEE Vol. PAS-97, No.4. 1978

The first paper in the world describing about realized products series of the gapless surge arresters (3.3~275kV) with theory, construction and characteristics.
(Principal Author)

- (2) Y. Ozaki, M. Takanashi, S. Tsurumi, K. Mitani and M. Kobayashi, " New Concepts on Overvoltage Protection by Surge Arrester " CIGRE 1978 Session Report No. 33-02

This is the first CIGRE Session Report describing new concepts, excellent characteristics and features of the gapless ZnO arrester. (One of two Principal Authors)

- (3) T. Nishikori, T. Masuyama, M. Matsuoka S. Hieda and M. Kobayashi, "Gapless Power Arrester by Zinc Oxide Nonlinear Resistors " 1973 National Convention Records of the IEE of Japan (in Japanese)

Misao Kobayashi

Although written in Japanese, this is the real first paper in the world introducing a major ratings, characteristics and outline of the gapless ZnO arrester for 66kV systems. (Principal Author)

(Principal Author)

Representative papers describing gapless MOSAs

IEEE PAPERS

- (1) Y. Harumoto, Y. Tsuda, M. Kobayashi, M. Mizuno and T. Aoki, " Evaluation for Application of Built-in Type Zinc Oxide Gapless Arrester " IEEE PWRD 1987-2 (Principal Author)
- (2) M. Kobayashi, M. Mizuno, M. Hayashi and Y. Sugita, " Metal Oxide Surge Arrester " IEEE Trans., Vol. EI-21 No.6, p989-996 (Principal Author)
- (3) I. Kim, T. Funabashi, H. Sasaki, T. Hagiwara and M. Kobayashi, " Study of ZnO Arrester Model for Steep Front Wave " IEEE 95SM 369-9 PWRD, 1995 (Leader of group)

CIGRE PAPERS

- (1) M. Kobayashi, M. Mizuno and A. Amano, " Evolution of the Test Methods on Metal Oxide Surge Arrester (MOSA) " CIGRE 33.87(Coll.) 08.07 hIWD, 1987 (Principal Author)
- (2) M. Kobayashi, " Protective Characteristics of ZnO Arrester(MOSA) to Steep Front Wave and Test Specification of IEC " CIGRE 33.91(Coll.) 2.3 IWD, 1991
- (3) M. Kobayashi and S. Yokoyama, " Lightning Protection of Distribution System in Japan " CIGRE 33.95(Coll.) 1.22 IWD, 1995 (Principal Author)
- (4) M. Kobayashi, T. Hagiwara and Y. Sakuraba, " Built-in Type ZnO Arresters for Distribution Pole Transformers " CIGRE 33.95(Coll.) 1.23 IWD, 1995

INVITED PAPERS

- (1) M. Kobayashi, T. Nitta and A. Schei, " Application and Test of Metal Oxide Arresters " Invited Lecture at CIGRE SC33 Colloquium, Rio de Janeiro, May, 1981 (Coauthor)
- (2) M. Kobayashi and M. Mizuno, " Development of ZnO Arresters and Their Application to Utility System " Ceramic Trans., Vol.3, Dec. 1988, American Ceramic Society, pp219