

OHTSUKI Takashi

“Pioneering Work on Electric Power Transmission and Distribution Engineering”

1. Biography

1893-4 Born, 1914-3 Technical Teacher Training School Attached to Tokyo Higher Technical School, 1916 Associate Professor of Tokyo Technical Higher School, 1920 Professor of Kumamoto Technical Higher School, 1929 Associate Professor of Tokyo Institute of Technology, 1932 Doctor of Engineering (Tokyo Imperial University), 1934 Professor of Tokyo Institute of Technology, 1954 Professor of Emeritus of Tokyo Institute of Technology, Professor of Meiji University, and Director at Technical Research Institute of Toyo Denki Seizo Co., Ltd., 1963 Professor of Tokai University, 1969 President of the Institute of Electrical Engineering of Japan, 1946 honored the Order of the Sacred Treasure, 1969-11 Demise.



(OHTSUKI Takashi)

2. Summary

OHTSUKI Takashi contributed pioneering work on establishing theories of electric power transmission and distribution engineering in the beginning of 1920, when small and medium scale power companies distributed electric power in Japan. He also made a trip to survey electric power engineering in European countries and the United States. His work was mainly on the analysis of grounding characteristics and the calculation of line-constants in a power transmission line, and the development of a circuit breaker. He was inaugurated as president of the Institute of Electrical Engineering of Japan in 1969 and passed away during the presidency.

3. Research Summary

3.1 Analysis of the grounding of a long-distance power-transmission line compensated by using Petersen earth coils

An arc discharge appeared at the ground fault is extinguished when the neutral point of a power-transmission line is grounded by a Petersen earth coil. Resonant current created by the inductance of the coil and the capacitance of the transmission line shows current zero phase and then the arc disappears. The grounding characteristics was analyzed by taking transmission lines as distributed constant circuits. The analysis taken into account not only the capacitance but also the inductance of the transmission line derived a general equation on the grounding characteristics. His work showing

the design guide on the grounding of a long-distance power-transmission line and contributed to power transmission engineering.

3.2 Formulation of line-constants for a three-phase double-circuit transmission line

Line-constants for transmission lines are necessary to analyze the transmission characteristics. OTSUKI showed formulation of the capacitance, one of the line-constants, for a three-phase double-circuit transmission line in 1932. He also obtained a matrix-solution of capacitance-calculation for it in 1965.

3.3 Development electrolyte power circuit breaker

Air, water, and incombustible substance were used as an arc-extinguishing medium in the 1930s. OTUSKI demonstrated electrolyte power circuit breaker in which electrolyte was used as an electrode and arc-extinguish medium. The arc appeared between metal and electrolyte electrodes was extinguished when the separation between them was increased. A prototype circuit breaker extinguished the arc at an operating voltage of 6000 V.

4. References

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- [3] T. Ohtsuki: "Calculation of Line-Constant on a Three-Phase Double-Circuit Transmission Line" J. Institute of Electrical Engineers of Japan, Vol.52 No.529 pp.602 (1932)
- [4] T. Ohtsuki, T. Deido: "Matrix-Solution of Capacitance-Calculation for Three-Phase, Double-Circuit Transmission Lines" J. Institute of Electrical Engineers of Japan, Vol.85 No.921 pp.160 (1965)
- [5] T. Ohtsuki, S. Horikoshi: "Electrolyte Circuit Breaker" J. Institute of Electrical Engineers of Japan, Vol.56 No.580 pp.1177 (1936)

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