Awarded “The Technological Development Award” at the 74th JSAE Awards

- Contributing to lightweight and the shift to aluminum wire harness through the expanded use of our original corrosion-proof terminals -

Furukawa Electric Co., Ltd. (Head Office: 2-6-4 Otemachi, Chiyoda-ku, Tokyo; President: Hideya Moridaira) and Furukawa Automotive Systems Inc. (Head Office: Inukami-gun, Shiga; President: Kentaro Sakamoto), a member of Furukawa Electric Group, were awarded “The Technological Development Award” at the 74th JSAE Awards during the 2024 Spring Congress hosted by the Society of Automotive Engineers of Japan, Inc.

The JSAE Awards were established in 1951 with the goal of “encouraging development engineering and automotive technology”. “The Technological Development Award” is one of six awards presented in the automotive technology category, and it is awarded to individuals who develop and/or co-develop new products or technologies that contribute to the advancement of automotive technology.

The current award was presented in recognition of the contribution to improved fuel efficiency resulting from reduced wire harness weight following the development of a new terminal that applies original materials and processing technology for corrosion resistance based on the company’s Alpha Terminal® (Note 1) and expanding the use to include large-diameter aluminum wires with over twice the diameter of the existing terminals.

Award	“The Technological Development Award” at the 74th JSAE Awards
Reason for selection	Development of a corrosion-proof terminal for large-diameter aluminum wires that does not require pre-crimping processing or corrosion proofing
Award recipients	Furukawa Automotive Systems Inc. – Takashi Tonoike, Shunsuke Kishihara Furukawa Electric Co., Ltd. – Junya Takeshita, Hitoshi Iijima, Saburo Yagi

Because the number of automobile wire harness circuits and weight increase along with the advances in CASE, there are growing expectations for the replacement of copper wires with lightweight aluminum wires. In response to the problem of corrosion at the junction between the aluminum wire and copper alloy terminal, we commercialized a corrosion-proof terminal (Alpha Terminal®) with a sealed tube structure for narrow-diameter aluminum wires. However, difficulty in welding thick terminals and connecting the terminal and wire remained an issue to commercializing a similar terminal for large-diameter aluminum wires. We solved this issue by combining the fiber laser beam mode control technology (Note 2) developed by Furukawa Electric Group and high precision press forming technology. The advancement led to the development and commercialization of an Alpha Terminal® for large-diameter aluminum wires. In addition, when connecting aluminum wires, it is necessary to destroy the oxide layer that forms on the surface of the conductor. With large-diameter aluminum wires having many strands, connection through crimping alone was deemed to be difficult due to excessive compression deformation. However, by optimizing the cable structure and applying the sealed tube structure, we succeeded in connecting large-diameter aluminum wire and the terminal without the previously required pre-crimping processing. Along with eliminating the need for pre-crimping processing and corrosion-proofing, this led to the development of an Alpha Terminal® for large-diameter aluminum wires with a thickness of 5-8sq, more than twice the size of the existing terminal. This new development will make it easier to adopt large-diameter aluminum wires, which will lead to lighter weight wire harnesses.

(Note 1) Alpha Terminal®: Similar to general-use terminals, the terminal is formed using a high speed press. The crimp connection is sealed in a tube structure using fiber laser welding. At the same time the aluminum wire is connected, the covering around the end of the wire is crimped to create a tightly sealed structure with excellent corrosion resistance.

(Note 2) Beam mode control: Technology that enables user-defined changes to the laser

beam shape pattern and power.
https://www.furukawa.co.jp/fiber-laser/en/product/tech/beam.html