

1. Research topic: Friction stud welding of different materials

Friction-welding methods developed in 1958 in the former state of Czechoslovakia were introduced to Japan in 1960. Current research related to friction welding extends to pressure welding of ceramics and special metals, but a unified theory does not yet exist, nor have nondestructive testing methods for couplings been established. However, the methods developed have been widely adopted and put to practical use in industry because they are characterized by high dependability, dimensional precision and high energy and work efficiency. Moreover, there is still room for research and development because this method can be also applied to different materials and objects other than metals.

Stud welding generally involves methods that primarily employ an arc welder, but there are limits to its range of uses. For example, it is not suited for use when facing upward and can only be used for similar materials such as steel and aluminum. Stud welding would also be possible if friction-welding machines were customized and used to a wide extent, conceivably offsetting the weak points of arc stud welding methods and leading to an expanded range of applications.

2. Published articles

- ① Friction welding of 6061 Aluminum Alloy pipe Carbon Steel Pipe
Gosaku Kawai, Kouichi OGAWA, Hiroshi TOKISUE : International Journal of Offshore and Polar Engineering, Vol.8, NO.2, pp.144-147
- ② Tensile Strength of Friction-Welded Joints of Aluminum Bronze to Steels
Gosaku Kawai, Hiizu OCHI, Hiroshi YAMAGUCHI, Keizou SAKURAI :
Advanced copper-base materials and technologies, Vol.44, No.1, pp.248-252
- ③ Evaluation of Tensile Strength and Fatigue Strength of Commercial Pure Aluminum/Tough Pitch Copper Friction-Welded Joints by Deformation Heat Input
Hiizu OCHI, Yoshiaki YAMAMOTO, Takashi YAMAZAKI, Takeshi SAWAI,
Gosaku KAWAI, Kouichi OGAWA: Materials Transactions, Vol.49,
No.12, pp.2786-2791.
- ④ Macrostructure and temperature distribution near the weld interface in friction the weld interface in friction
Hiizu OCHI, Gosaku KAWAI, katsuyoshi MORIKAWA, Yoshiaki YAMAMOTO,
Yasuo SUGA: Structure, fracture and Complexity, Vol.5, No.2-3(2009), pp.79-88
- ⑤ Strength of 2017 aluminum alloy stud joints by friction welding
katsuyoshi MORIKAWA, Gosaku KAWAI, Hiizu OCHI, Yoshiaki YAMAMOTO,
Yasuo SUGA: Welding International, Vol.27, No.1 pp.18-23
- ⑥ Strength of 5083 aluminum alloy stud joints
Hiizu OCHI, katsuyoshi MORIKAWA, Takahiro MORITANI, Yoshihiro ISSIKI,
Gosaku KAWAI: Structure, Fracture and Complexity, Vol.8, No.3(2014),
pp.145-151