

U+RSW – A Break-Through Process for Dissimilar Metal Joining

A welding technique that joins two dissimilar metals.

The Need

Resistance spot welding (RSW) is critical to automobile manufacturing, with 3,000 to 5,000 spot welds per vehicle. As consumers seek vehicles with better fuel economy, automobile manufacturers are increasingly using bi-metallic structures such as advanced high-strength steel (AHSS) to aluminum (Al) and magnesium (Mg) alloys. However, a viable cost-effective solution to join such dissimilar metals has not been developed.

The Technology

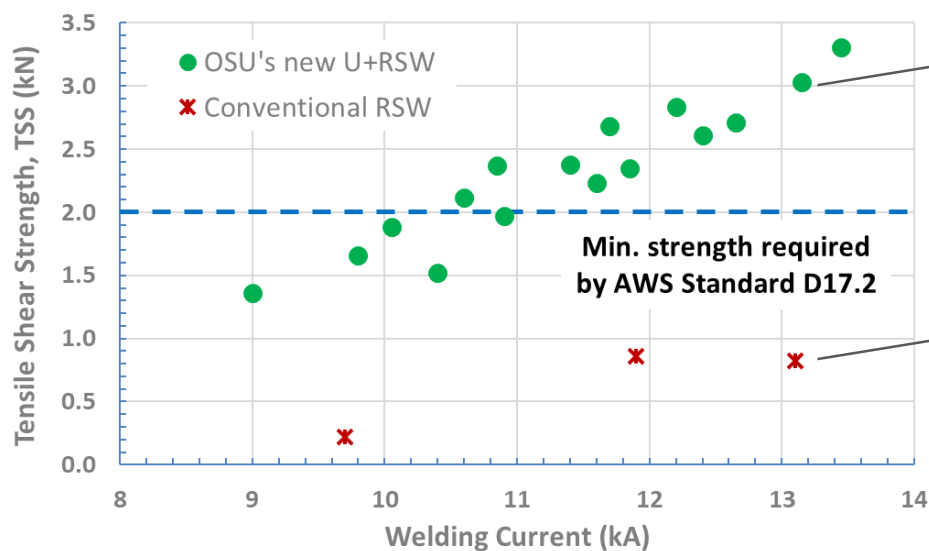
Researchers at The Ohio State University (OSU), led by Dr. Wei Zhang of Dept. Materials Science and Engineering, have developed a novel process that utilizes ultrasonic plus resistance spot welding to improve the strength of a weld between dissimilar metals. The figure below plots the joint strength of 1-mm-thick AISI 1008 steel to 1-mm-thick AA 6061-T6 welded using OSU's new U+RSW process. The failure mode was button pull-out on the aluminum side. On the other hand, the joints welded with conventional RSW had inferior strength and failed in the interfacial failure mode.

Commercial Applications

Welding dissimilar metals for manufacturing in the fields of automobiles, aerospace, healthcare, etc. Dissimilar metal pairs include AHSS to Al or Mg, titanium to stainless steels or Ni alloys.

Benefits/Advantages

Provides a quick, cost-effective method to join dissimilar metals with superior joint strength.



Tech ID

T2017-304

College

College of Engineering
(COE)

Licensing Manager

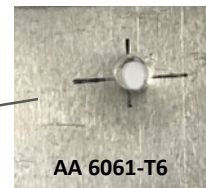
Wohlgamuth, Christopher
wohlgamuth.5@osu.edu
614/247-8331

Inventors

Zhang, Wei
zhang.3978@osu.edu
Lu, Ying
Kimchi, Menachem
Mayton, Ellis

Categories

Engineering & Physical
Sciences
Industrial & Manufacturing
Transportation
Automotive
Welding



OSU: Button pull-out failure of the aluminum sheet



Conventional: Interfacial failure & severe expulsion