

# DEVELOPMENT OF AUTOMATIC EXPANSION FIXTURE FOR WELDING THIN AND SPECIAL-SHAPED AIRCRAFT OIL COLLECTOR

Yung-Tien Liu<sup>1</sup>, Sheng-Yuan Chen<sup>1</sup>, Sheng-Yuan Jhang<sup>2</sup>, and Kuo-Hao Tseng<sup>2</sup>

<sup>1</sup>*Department of Mechanical and Automation Engineering, National Kaohsiung First University of Science and Technology (First Tech), Kaohsiung City, Taiwan (R.O.C.)*

<sup>2</sup>*Aero Win Technology Corporation, Tainan City, Taiwan (R.O.C.)*

**ABSTRACT:** Oil collector is an important component in aircraft engine and has to be regularly replaced. The oil collector is produced by assembling several thin and special shapes of circular parts via TIG welding. To prevent uneven deformation in welding process, a radial expansion force generated by a manual screw-type wedge is applied to the welding parts. However, due to specially-shaped parts, currently, it requires three loading and unloading processes to fabricate the oil collector. To increase productivity, this paper proposes a hydraulic-type automatic expansion fixture instead of the manual screw-type wedge. With the special designed fixture, the production of the oil collector can be significantly reduced to only one loading and unloading process. In addition, due to the automatic expansion function, the force acting on the welding part is more stable than that of the manual type.

**Keywords:** Special-shape, Oil collector, Automatic fixture, Wedge, TIG welding, Hydraulic system