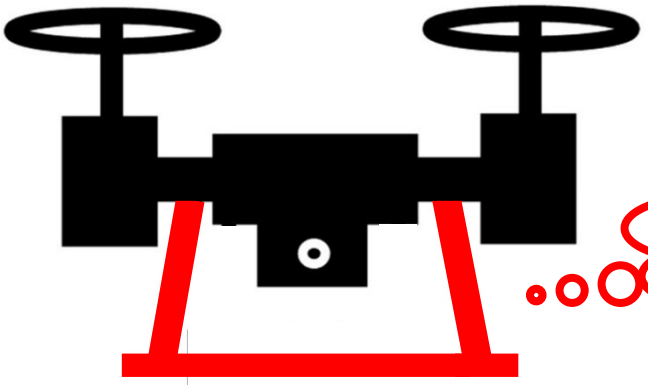
Time to Rethink Your Industrial Drone Frame?



✓ Assembly takes more effort than expected
✓ Meeting specs that differ for each customer
✓ Additional machining needs, and more...

We propose welded airframes made of magnesium alloy pipe

What Is Magnesium?

The lightest of metals — one-quarter the density of steel and two-thirds that of aluminum. Pairing light weight with high strength, it is a much-talked-about new material whose adoption is growing explosively, mainly in mobile devices such as laptops and digital cameras. Its vibration absorption, high recyclability, and kindness to people and the environment also draw attention.

Can Magnesium Be Machined?

Traditionally, magnesium processing was limited to die casting and injection molding. Macrw Co., Ltd. has established bending and welding methods — starting with our proprietary cold-drawn tubing — enabling machining on par with other metals. Product development using magnesium alloy pipe, such as wheelchairs and furniture, is also advancing.

	Mg Alloy Pipe	Al Alloy Pipe	CFRP Pipe
Light weight	◎	○	◎
Cutting	◎	○	X
Plastic forming (bending)	△→◎	◎	X
Welding	△→◎	◎	X
Painting	○→◎	◎	△
Cost	○→◎	◎	△
Recyclability	◎	◎	X

Benefits of Using Magnesium Alloy Pipe

Achieve a top-class lightweight airframe while keeping the advantages of metal

1. Form a wide variety of shapes from general-purpose stock (pipe, etc.) via plastic forming and welding
2. Easy secondary machining such as drilling
3. Many color finishes possible (we use powder coating)
4. Fully recyclable

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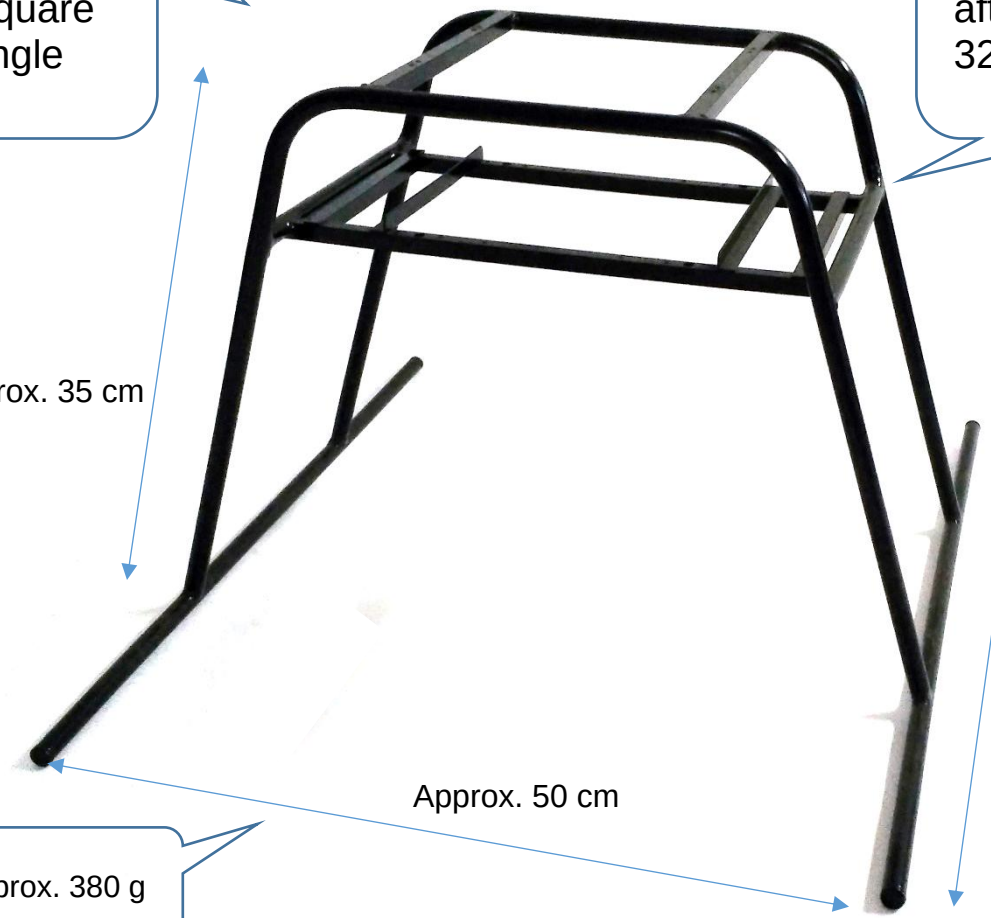
Case 1

Magnesium Alloy Pipe Drone Landing Skid

What is a landing skid? A part used when the aircraft touches down. It protects the camera, payload, and other items on landing. Being light yet strong is essential.

All magnesium alloy. Uses round pipe plus square pipe and angle stock.

Fixed by welding after assembly. 32 welded joints.



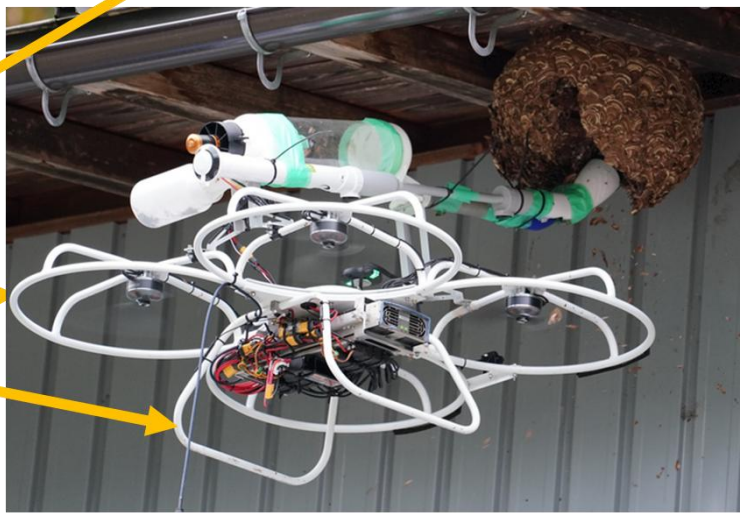
Weight: approx. 380 g

* Winner of the Japan Magnesium Association “Technology Award”
https://prtimes.jp/main/html/rd/p/000000024.000018527.html

Case 2

Magnesium Alloy Pipe Drone Landing Skid, Arm, and Propeller Guard

Magnesium alloy pipe material



Our Recycling Initiatives

Development of a Recycling Technology for Magnesium Alloy Scrap Using Extrusion Processing

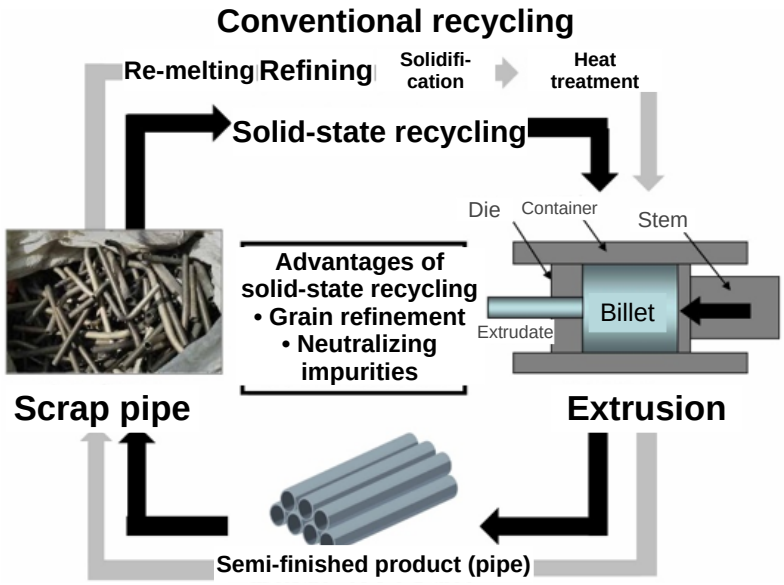
— Toward realizing horizontal recycling of magnesium alloy scrap —

Macrw Co., Ltd. (HQ: Fujinomiya, Shizuoka; President: Masashi Abe) has developed a recycling technology for magnesium alloy scrap that uses extrusion processing, through joint research with the National Institute of Advanced Industrial Science and Technology (AIST; HQ: Chiyoda-ku, Tokyo; President: Kazuhiko Ishimura) — specifically with Yasumasa Chino of the Multi-Material Research Department and invited researchers Naofumi Saito and Isao Nakatsugawa.

This technology was developed by drawing on AIST's technical know-how in the "solid-state recycling method," together with its surface-analysis and microstructure-analysis techniques, and by using an FY2021–2023 Shizuoka Prefecture advanced-enterprise development project subsidy.

Overview

As attention grows toward magnesium — the lightest structural metal, increasingly adopted in welfare equipment such as canes and wheelchairs — recycling technology for magnesium scrap is sought from the standpoint of reducing environmental impact. Through joint research with AIST, Macrw developed a recycling technology based on the "solid-state recycling method," in which magnesium alloy scrap is directly extruded to consolidate and regenerate it. Unlike material collected and regenerated at recycling plants, this method enables low-energy recycling without degrading the quality of the recycled product (Fig. 1). Through this development, we confirmed that scrap material (pipe) regenerated by the solid-state recycling method exhibits mechanical properties and corrosion resistance nearly identical to the pre-recycled material. Going forward, by processing recycled material with this technology, we plan to expand our business toward using regenerated magnesium alloy not only as a structural material but also as a functional material.



https://www.aist.go.jp/aist_j/press_release/pr2024/pr20240716/pr20240716.html