

CASE STUDY

Standardizing CNC Machining for a Family of Aluminum Frame Parts

How a universal fixturing approach reduced setup times by ~90% and enabled near-instant part number changeovers

Industry	Oil & Gas / Electronics
Parts	Aluminum electronics enclosures up to 1" thick × 2" wide × 18" long
Process	CNC Machining (2D and 3D milling, drilling, tapping)
Key Result	~90% reduction in setup time; near-instant part number changeover allows our customer to expedite and de-expedite as needed

Background & Challenge

Our customer produces a family of 300+ aluminum frame parts used in PCB assemblies. While these parts share a similar profile and dimensional envelope, each individual part number has unique features, hole patterns, and geometries.

Under the previous production approach:

- Each part number required its own unique fixturing and tooling setup
- Once a CNC mill was configured for one part number, only that part could be produced until the order was complete
- Setup changes between part numbers consumed significant time and labor
- Lead times were difficult to compress, and flexibility for expedite or de-expedite requests was limited

The challenge was clear: with a growing family of part numbers and fluctuating demand, the customer needed a supplier who could respond quickly and efficiently without sacrificing quality.



PCB frames of varying geometries and sizes

Our Solution: The “Tabbing Method”

Over time, we noticed a pattern in our customer’s part sizes; the vast majority of them fell within a 1” x 2” x 18” window. Even though the geometries and hole patterns varied, we knew that we could use this constant to standardize the workholding in our CNC machines.

Through internal R&D and iterative trial and error, our team developed a universal setup method, which we call the “Tabbing Method”, capable of producing any aluminum frame part within this 1” x 2” x 18” work envelope.

Using this setup, multiple distinct part numbers can be produced on the same machine, using the same fixture, the same raw material, the same X, Y, and Z offsets, and mostly the same cutting tools. The main variable is the CNC program loaded into the machine.

How It Works

Step 1: Raw Material Preparation

Aluminum blanks are prepared in advance with machined surfaces and a standardized hole pattern:

- Up to 18 holes are used to screw the blank securely into the fixture plate
- 4 precision locating holes, matched with holes in the fixture plate, are used to align the part to within 0.0005” (0.013mm) accuracy when flipping to machine the bottom side

This preparation step can be done in bulk and asynchronous to the actual part manufacturing, allowing hundreds of blanks to be stocked and ready for any part number in the family.

Step 2: Feature Machining

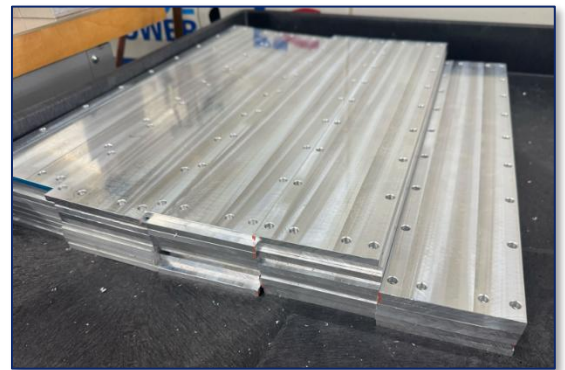
The CNC machine mills and drills the unique features of each part number into the prepared blank. Because the fixturing and locating system is universal, no setup changes are needed when switching between part numbers.

Step 3: Tabbing & Part Release

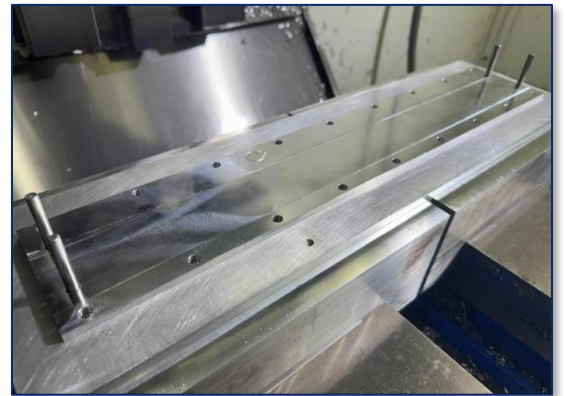
A final contouring pass cuts the part to its final outer shape, intentionally leaving small “tabs” of material connecting the part to the surrounding blank stock, similar to a model airplane or car kit. Leaving this tool path to the end keeps the part secure and dimensionally stable through the end of the machining cycle.

Step 4: Finishing

Once removed from the machine, the tabs are cut, the part is deburred and cleaned. It then proceeds to quality control and, as required, plating or coating.



Prepared Raw Material



Dowel pins locate the part when flipping



Finished part ready for removal from tabs

Results & Benefits

The Tabbings Method has delivered immediate, measurable improvements across lead time, flexibility, and quality:

- **~90% reduction in machine setup time between part numbers**
 - Previously, full fixture and cutting tool changes were required for every new part number
 - Now, changeovers are near-instantaneous. Only the CNC program and sometimes a few cutting tools change
- **Significantly improved lead times for standard and expedited orders**
 - Bulk raw stock preparation allows production to begin immediately
 - Little-to-no machine downtime waiting for fixturing or tooling changes
- **Greater flexibility to accommodate expedite and de-expedite requests**
 - Production can be redirected to priority part numbers on short notice
 - Customer demand fluctuations can be absorbed without lead time and cost penalties
- **Enhanced quality consistency across the part family**
 - Precision dowel pin locating system ensures repeatable flip-side alignment to 0.0005"
 - Standardized tooling cuts down variability introduced by full cutting tool changeovers

Why This Matters for Your Business

The Tabbings Method represents more than a process improvement; it is a strategic capability we can deploy for customers with families of parts. If your organization produces multiple part numbers that share a common dimensional profile, this approach can deliver:

- Faster delivery on both standard and urgent orders
- Reduced supply chain disruptions from revision changes
- More predictable lead times even as demand fluctuates
- Consistent quality across every part number in the family
- A supplier partner invested in long-term continuous improvement

Contact Us

To learn more about how we can apply this approach to your parts, please reach out.

Dan Mihelich

President, Saliba Industries

dan.mihelich@salibaindustries.com

952 S Northpoint Boulevard, Waukegan, Illinois 60085

Office: (847) 680-2266 | www.salibaindustries.com

