

## ***Modeling and Predicting Cost Occurs at Multiple Levels***



Munro has always recognized that cost metrics are critical to building a business case for any change or improvement. Upon analyzing many options, good “Total Accounted Cost” modeling helps focus a team on effective, right-first-time execution. As we have developed our internal capability to estimate cost, we realize that “costing” means different things to different people. Following is a list of five areas that require differing approaches, metrics and methods to develop good cost models and analyses.

- Requirements versus Cost
  - Requires rapid yet comprehensive costs associated with requirements for meaningful analyses of alternatives when setting expectations and direction
- Individual Components Should Cost
  - Requires robust cost models for various metal, plastics, forming, cutting, packaging, shipping, country labor rates, tariffs, etc.
- Factory Assembly / Production Cost
  - Requires a complete understanding of all steps, operations and issues along with engineering time, supply chain and production knowledge and metrics
- Quality and Reliability Cost
  - Must expose risk and complexity in the plan, apply statistical and collected data to roll-up likely realistic scenarios and costs
- Lifecycle Operations and Sustainment Cost
  - Requires robust models of service operations, roll-up effects on layered systems, exposing long term likely events and use cases

Munro provides cost estimating tools and services for all five areas mentioned above. If you would like better tools or help with more accurate, faster estimating, please call Munro.

As an example of Munro’s capabilities we have listed below the Individual Components Should Cost models that we have available.

# Munro Component Cost Models

To enable good cost estimates of individual components, Munro has developed the following models.

**I. Flowforming:** **1. Plastics:** Compounding, Thermoplastic Injection Molding, General (one color), 2 Color, 3 Color, Injection Compression, Compression Molding, Transfer Blow Molding, Injection Blow Molding, Resin Transfer Molding, Structural RIM, Thermoset Injection Molding, Urethane Foam Molding, Hand Lay-up, Spray-up, Pre Preg Vacuum Bag Autoclave, Rotational Molding, Filament Winding, Thermoplastic Extrusion, Pultrusion, Thermoforming **2. Metals:** Metals Compounding Metallurgy, Thixomold (magnesium), MIM (usually steel, titanium etc.), Sand Casting, Shell-Mold, Casting, Permanent Mold Casting, Plaster Casting (Usually Aluminum), Investment Casting (Lost Wax and Lost Foam), Die Casting Aluminum, Die Casting Magnesium, Powder Metallurgy, Cold Forging (Impact-Extrusion), Warm (Super-plastic) Forging, Hot Forging, Extrusion, Wire Forming **3. Ceramics:** Ceramic Injection Molding, Isostatic Pressing, Slip Casting Ceramic Insulation (Silica & Aluminum)

**II. Metal Forming:** Stamping, Fine-Blanking, Progressive Die Stamping, Transfer Press Stamping, Transfer Line Stamping (Automated Tandem Line ), Transfer Line Stamping Manual, Press Brake Forming, Spinning, Hydro-forming, Flow-Forming, Extrude-Honing, Roll Forming, Tube Forming

**III. Metal Cutting:** Shearing, Turreted Punch Press (Wiedaman,) Laser Cutting, Water-Jet Cutting, Flame Cutting, Sawing, Wire EDM, Plasma Cutting

**IV Joining:** **Plastics:** Ultrasonic Welding, Vibration Welding, Hot-Plate Welding, Laser Welding, Spin Welding, Adhesive Bonding, Riveting **Metals:** Tack Welding, Spot Welding, Plug Welding, TIG Welding, MIG Welding, Brazing, Soldering, Diffusion Welding, Spin Welding

**V. Metal Removals:** Turning (work turns), Milling (cutter turns), Drilling, Tapping, Reaming, Boring, Grinding, Broaching, Hobbing, Lapping, Honing, Super-finishing, Electrical Discharge, Chemical Milling, Photo-chem Etching, Polishing, Buffing, Shot Blasting, HVM High Velocity Machining, Wire Brushing, Buffing, Polishing, Tumbling, Electropolishing

**VI. Coatings** Painting, Rubber Coatings, Vinyl Coatings, E-Coating, Electro-Plating Coating, Electro-less Nickel Coating, Physical Vapor Deposition Coating, Sputter Coating, Arc Source Coating, Evaporation Coating, Glow-Discharge Coating, Hot Stamp/Foil, Pad Printing, Chemical Vapor Deposition Coating, Plasma Spray Coating, Diffusion Coating, Chemical Conversion Coating

**VII. Conversions** Heat Treat, Sinter, Quench & Temper, Carburize

**VII. Assembly** Assembly, Mechanical Assembly, Circuit Board, Wire Harness

For more information on total cost estimating solutions, please call Munro & Associates at 248-362-5110.