**Modifying Design Using Group Technology (GT)**

**1. What is Group Technology (GT)?**

**Group Technology (GT) is a manufacturing philosophy that groups similar parts or components into families based on their design and manufacturing attributes. This helps standardize processes, reduce tooling costs, and improve production efficiency.**

**Benefits of Group Technology in Design Modification**

**✔ Reduces Part Variety → Standardized components lower design complexity.  
✔ Minimizes Setup Time → Similar parts share common fixtures and machining setups.  
✔ Improves Manufacturing Efficiency → Faster production and reduced lead times.  
✔ Enhances Design Reusability → Encourages modular design and interchangeability.**

**2. Applying GT to Modify Design**

**A. Part Family Classification (Coding Systems)**

**GT uses classification and coding to identify commonalities in part design. The most common systems include:**

**1️⃣ Opitz Coding System – Based on shape, dimensions, features, and operations.  
2️⃣ MICLASS System – Focuses on geometric and production attributes.  
3️⃣ DCLASS System – Categorizes parts based on design and machining needs.**

**✅ Example: Instead of designing 10 different brackets, GT classifies them into 3 standard bracket families, reducing unique designs.**

**B. Design Simplification & Standardization**

**✔ Reduce Unique Features → Standardize hole sizes, thread types, and fillet radii.  
✔ Use Modular Design → Break complex components into reusable subassemblies.  
✔ Optimize for Common Machining Processes → Ensure parts are easily manufacturable with shared tools and setups.**

**✅ Example: Instead of casting custom housings for each project, use a standardized base with modular add-ons.**

**C. Process-Oriented Redesign (Cellular Manufacturing)**

**✔ Organize Machines Based on Part Families → Instead of arranging by function (lathe, mill, drill), arrange in cells for faster processing.  
✔ Minimize Setup Changes → Ensure parts share tooling, jigs, and fixtures to streamline manufacturing.  
✔ Reduce Unnecessary Features → Avoid complex shapes requiring multiple operations or custom tooling.**

**✅ Example: Instead of designing unique castings for different motor housings, create a base housing family that can be machined or modified as needed.**

**3. GT in Casting & Machining Design**

| **Aspect** | **Without Group Technology** | **With Group Technology** |
| --- | --- | --- |
| **Design Complexity** | **Unique designs for each part** | **Standardized part families** |
| **Machining Operations** | **Different setups for each part** | **Shared setups for similar parts** |
| **Manufacturing Cost** | **Higher due to variety** | **Lower due to standardization** |
| **Lead Time** | **Longer** | **Faster production** |