

Thread Repair Method Selection Guide

Tip: Choose the simplest repair method that meets your strength and size requirements.

Repair Method Comparison Chart

Method	Best For	Advantages	Limitations	Strength	Cost
HeliCoil (Wire Insert)	Aluminum, magnesium, soft metals, frequently serviced joints	150-200% parent strength, maintains original size, industry standard	Requires STI tap, tang removal (standard type), proper tooling	Excellent (150-200%)	Medium
Tangless HeliCoil	Blind holes, automated assembly, aerospace	No tang debris, cleaner installation, faster	Special installation tool required, higher insert cost	Excellent (150-200%)	Medium-High
Solid Bushing (Key-Lock)	Cast iron, steel, high-load applications, vibration	Highest torque capacity, won't rotate, vibration resistant	Requires broaching, more complex installation	Very High (200%+)	High
Oversized Repair	Non-critical applications, mild steel, when space permits	Simple, no special tools, economical	Changes thread size, requires oversized bolt, may not fit	Good (100%)	Low
Thread Chaser	Minor damage, cleanup, burrs, corrosion	No material removal, quick, preserves original	Won't fix severe damage, limited restoration	Restores to original	Very Low

Selection Decision Tree

Question 1: How severe is the thread damage?

- **Minor (burrs, light corrosion, first 1-2 threads):** → Try thread chaser first
- **Moderate (multiple threads damaged but repairable):** → Proceed to Question 2
- **Severe (stripped, broken material, cracking):** → Evaluate component replacement

Question 2: Must original thread size be maintained?

- **YES - size must stay the same:** → Use HeliCoil or solid bushing insert
- **NO - larger bolt acceptable:** → Consider oversized repair (simpler)

Question 3: What is the parent material?

- **Aluminum or Magnesium:** → HeliCoil (stainless) - industry standard
- **Cast Iron:** → HeliCoil or key-locking solid insert
- **Steel:** → Any method works; choose based on load requirements
- **Plastic/Composite:** → Heat-set or press-fit inserts (not HeliCoil)

Question 4: Is this a through-hole or blind hole?

- **Through-hole:** → Any method; standard HeliCoil works well
- **Blind hole:** → Tangless HeliCoil preferred (no tang debris)

Question 5: What are the load and vibration requirements?

- **Light duty, low vibration:** → HeliCoil or oversized repair
- **Heavy duty, high vibration:** → Key-locking solid insert
- **Critical application:** → Consult engineering; consider component replacement

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Application-Specific Recommendations

Application	Recommended Method	Insert Material	Insert Length
Aluminum engine block	HeliCoil	Stainless steel	1.5D - 2.0D
Aluminum cylinder head	HeliCoil or spark plug kit	Stainless steel	2.0D (spark plugs)
Cast iron manifold	HeliCoil or solid bushing	Carbon steel or stainless	1.5D
Steel machinery frame	Key-locking insert	Carbon steel	1.5D
Transmission case (aluminum)	HeliCoil	Stainless steel	2.0D
Differential housing	HeliCoil or solid bushing	Stainless steel	1.5D - 2.0D
Exhaust manifold stud	HeliCoil (high-temp)	Inconel or stainless	2.0D
Motorcycle crankcase	HeliCoil	Stainless steel	1.5D - 2.0D
ATV/UTV plastic body panel	Heat-set insert	Brass	Per manufacturer
Marine aluminum	HeliCoil	316 stainless	2.0D

Insert Material Selection

Insert Material	Best For	Avoid When
Stainless Steel 304	Aluminum, magnesium, general purpose, corrosive environments	Highest strength required, magnetic sensitivity
Carbon Steel	Steel, cast iron, high-load applications	Aluminum (galvanic corrosion), corrosive environments
Phosphor Bronze	Aluminum, electrical applications, anti-galling needed	High-strength requirements
Inconel	High-temperature (exhaust, turbo), extreme environments	Cost-sensitive applications

When to Consider Component Replacement Instead of Repair:

- Surrounding material is cracked or damaged
- Wall thickness is insufficient for repair insert
- Multiple previous repairs have been attempted
- Safety-critical application with unknown history
- Cost of repair approaches cost of replacement
- Thread damage extends full depth of hole

⚠ **Important:** For safety-critical applications (suspension, steering, structural), consult engineering specifications before proceeding with any thread repair. Some applications require component replacement regardless of repair quality.