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Journal Bearing Removal Improvement

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Ben Gibson, Matt Johnson, Lucas Kramer, and Chad Martin

Journal Bearing Removal Improvement

Client: Danfoss Power Solutions, Ames, IA

Problem Statement

- Current method of removing journal bearings from castings is labor intensive, poses safety risks, and creates contamination.
- Develop a new method and, if necessary, tooling, to improve the bearing removal process.

Objectives

- Eliminate safety hazard posed by hammer blows
- Cut bearing removal time by 50%

Constraints

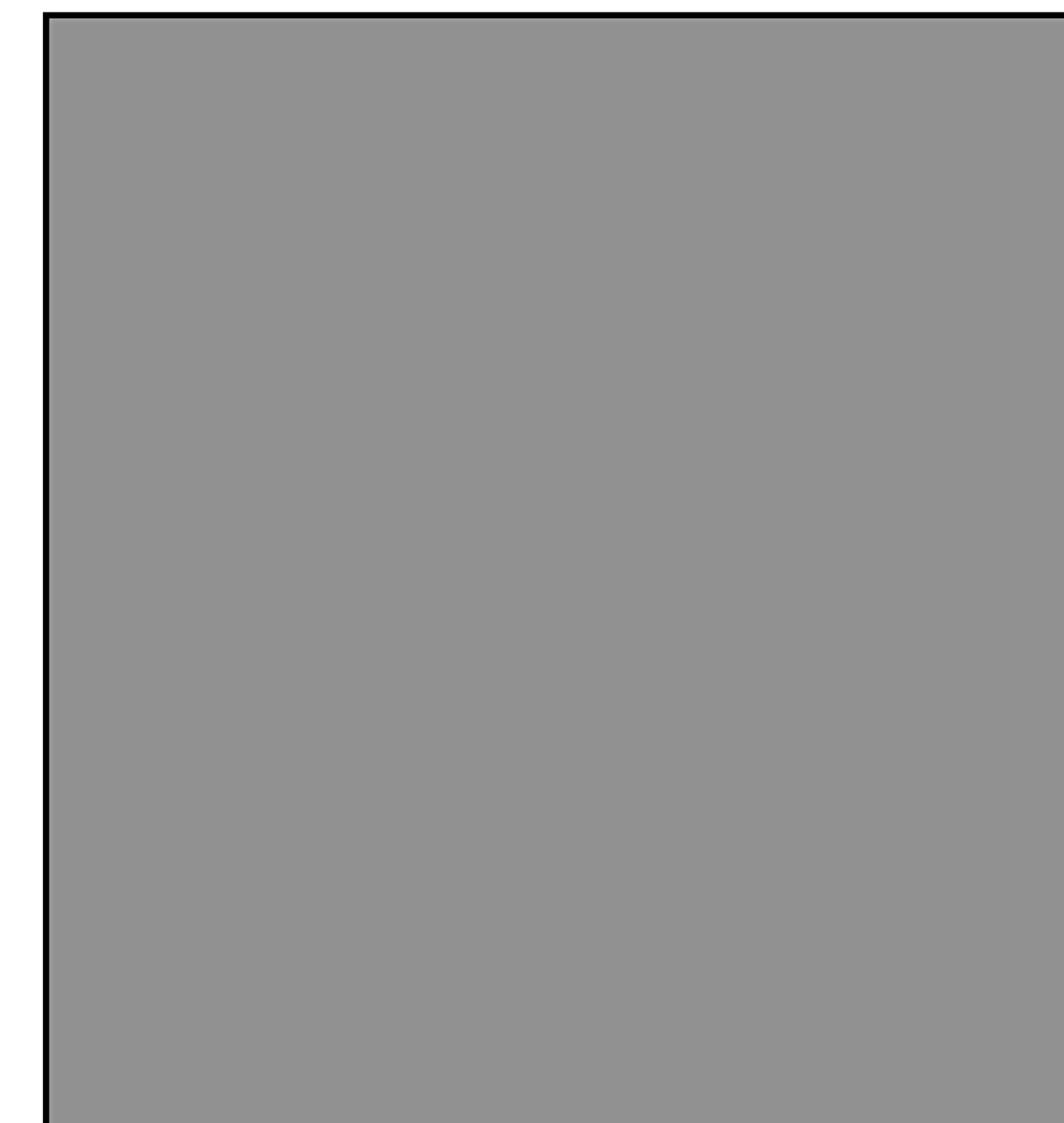
- Simple to use, with minimal training required.
- Easily maintained and/or replaced when worn
- Works for journal bearings ranging from 28-65mm ID, and 17-45 mm deep

Proposed Solutions

- Air hammer with 180 degree attachment ("Texas Twister") to ease impact-based removal

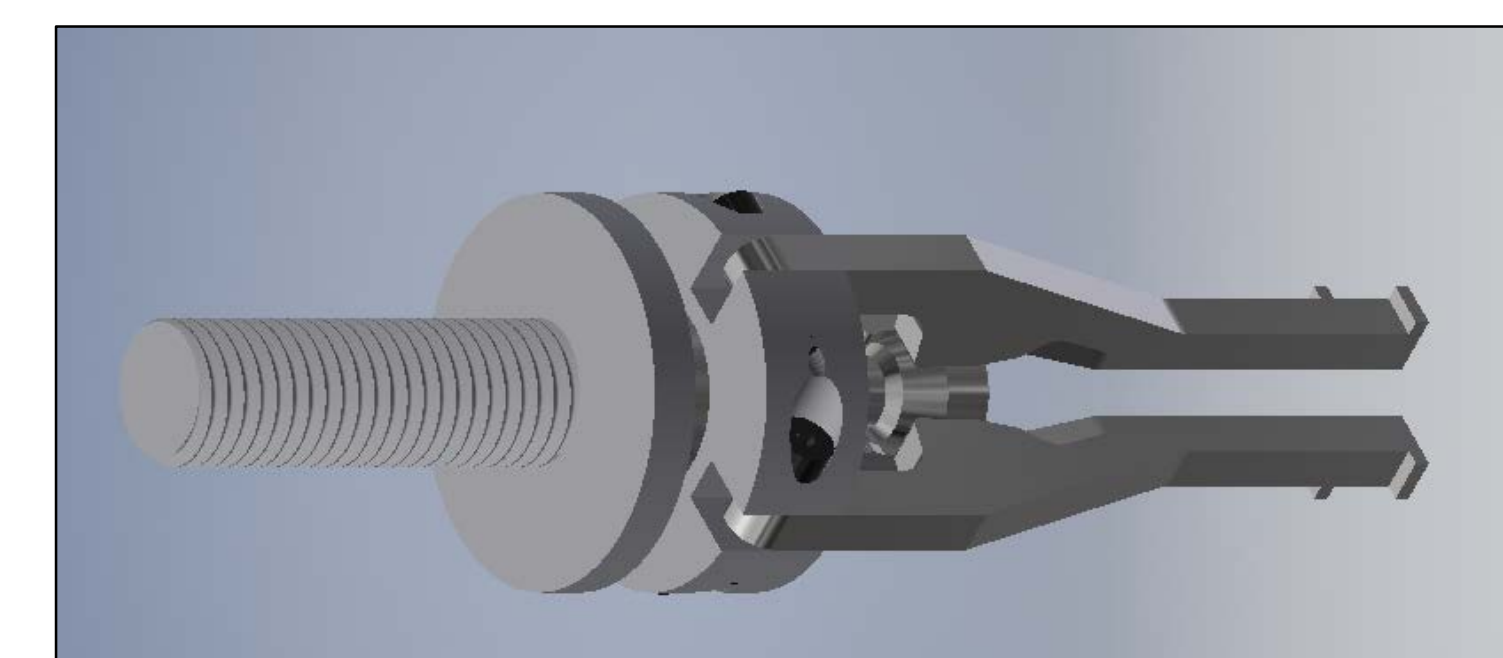
OR

- Dedicated station with hand-operated hydraulic cylinder to pull bearings from casting



Left: Technician strikes hand with hammer while chiseling a bearing from a casting. Above: mangled bearing introduces metallic contamination to clean assembly area. Photo credit Ben Gibson

Right: The "Texas Twister" air hammer puller adapter installed on a pneumatic air hammer. Photo credit: vehicleservicepros.com



Left: inexpensive commercially available puller attachments. Credit: Alibaba.com
Above: CAD model of prototype puller by this team

Methods

- Technician interviews and informal time studies for current process
- Technician interviews on preference and feasibility of proposed solutions
- If applicable, CAD model of custom tooling
- If applicable, fabricate custom tooling with both university and company resources
- 3D printing, Waterjet, CNC Mill/Lathe, Welding, Heat Treating
- Technician interviews and time studies for new process.

Major Outcomes

- Tool design/fabrication or off the shelf tool selection
- Training documentation for technicians
- Process implementation
- Quantization of improvement

Benefit to Client

- Increased operator safety
- Reduced cycle time
- Reduced contamination potential
- Reduced part damage