The T55 jet engine used in the CH-47 Chinook helicopter contains either the T712 (Figure #1) or the T714 (Figure #2) compressor rotor. After so long, these compressor rotors need rebuilt to original equipment manufacturers (OEM) specifications. Corpus Christi Army Depot’s (CCAD) current process requires numerous set-ups resulting in a turn around time of 15 to 16 hours to completely refurbish the compressor rotor. Due to a change in compressor rotors from the T712 (Figure #1) to the T714 (Figure #2), CCAD is in need of a grinding center to reduce the cycle time and to accommodate the addition of a 17.5” shroud which is not present on the T712 (Figure #1). The National Center for Defense Manufacturing and Machining (NCDMM) was requested to evaluate the current process and provide a total grinding solution for the process. This solution is to eliminate the multiple set-ups and reduce the current cycle time to allow 4 to 5 assemblies be ground per day.
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**Process Improvement**

Due to the uniqueness of the operation along with the size of the compressor rotor assembly, very few state-of-the-art machine choices exist. Danobat Machine Tool Company manufactures a complete line of machines specifically for blade tip grinding. The Dantip R1 400/600 CNC High Speed Grinding, Deburring and Measuring Machine (Figure #3) is one option chosen for this operation. The second option is a Hardinge supplied Kellenberger Kel-Varia grinding machine/Marposs gauging system combination (Figure #4). Both options offer quality and reliability in the field of grinding.

**Implementation and Technology Transfer**

The Danobat solution requires only one set-up resulting in a cycle time of approximately 3 hours per assembly. The Kellenberger/Marposs combination requires at least two set-ups due to the off-line gauging system resulting in a cycle time of 7 to 8 hours per assembly.

By implementing one of the above solutions, CCAD will have the ability to increase their production of the T712 and T714 compressor rotors to meet the needs of today’s warfighters.

**Expected Benefits**

**Expected Cost/Time Savings:**

- The Danobat solution, with a cost of nearly $1.2M, generates annual savings of $162,500 machining 100 units/year. This results in a 7.3-year payback.
- The Kellenberger/Marposs solution, with a cost of nearly $850K, generates annual savings of $112,500 machining 100 units/year. This results in a 7.5-year payback.

**TIME LINE / MILESTONE**

Start Date: November 06  
End Date: April 07

**PROJECT FUNDING**

NCDMM Funding: $40K

**PARTICIPANTS**

Danobat Machine Tool Company  
Hardinge Inc.  
NCDMM

THE INFORMATION IN THIS TECHNICAL REPORT REFLECTS THE U.S. ARMY’S DEPLOYMENT OF CERTAIN TECHNOLOGIES AND IS NOT AN ENDORSEMENT OF ANY COMPANIES, SERVICES, OR PRODUCTS.

For additional information about the NCDMM, please visit our website at www.ncdmm.org