

# Navy in AMS 2432 Compliance with New Shot Peening Machines

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By Jack Champaigne, The Shot Peener

In May 1995, Progressive Technologies successfully completed the customer runoff of the last of three automated, precision shot peening machines that will be delivered to Navy Maintenance Depots located in California, North Carolina, and Florida. The Navy was in need of a system that would be flexible enough to address a large variety of peening requirements for numerous aircraft parts. (And be in compliance with AMS 2432. See inset.)

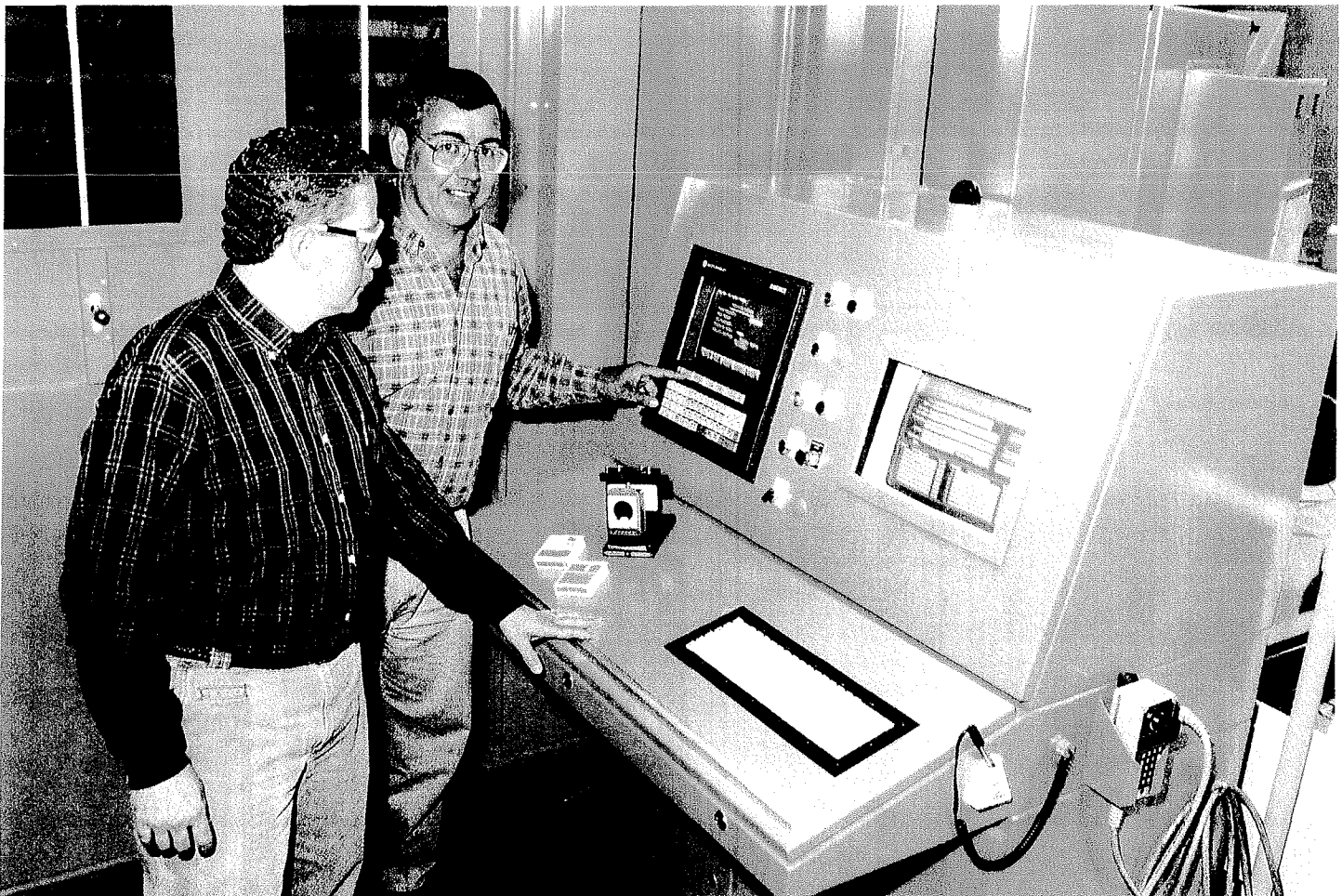
These parts vary considerably in size and geometry, and pose a number of intricate peening challenges. In addition to the need for a versatile, rugged, and reliable system, the Navy required the capability to control the process and a means to ensure proper parts selection and programming for the myriad of possibilities that can and will find their way into the Depots.

The machine was designed to shotpeen a part while it is either rotating or stationary using two independently controlled gantry robots with either of two sizes of steel shot. Parts of any shape and size (within the limits of the cabinet - 138" high by

111" wide by 127" deep) can be processed easily by the 5-axis top mounted robot and the 4-axis side robot. Cylindrical parts can either be rotated on the turntable or accurately positioned. Using the dual robots and the exclusive Quad Pressure Engine System, different surfaces on the same part can be processed simultaneously, even at different pressures.

The part program dictates which media size is required; and the CNC automatically activates the appropriate Pressure Engine, eliminating any loss of process time usually associated with manual adjustment and media changeover. Media is delivered through nozzles capable of flow rates up to 100 pounds per minute. Spent media is routed and classified through two large vibratory separators to assure shot integrity before being returned to the appropriate Pressure Engine.

Media flow, air pressure, air usage, robot position, turntable position, speed, and all other critical parameters are controlled by the CNC. The machine is equipped with Progressive's exclusive Process Reporting and Integrated Monitoring System (PRIMS™), which monitors and ensures all



Darrell McKinley and Jon Devereaux from the U.S. Navy at the computer that interfaces with the robot.

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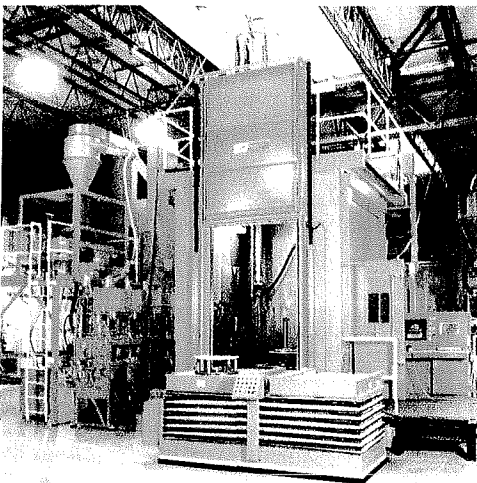
parts are processed to specification and, also, produces a hard copy printout detailing exactly how each part was processed.

Material handling has been addressed in a unique manner. Progressive has introduced a Shuttle Conveyor Product which is external to the cabinet that enable one part to be readied for loading while another part is in process. The shuttle conveyor consists of two sections of powered roller conveyor mounted on top of a traversing cart. When a part inside of the cabinet is completed, the load door rises and the platen carrying the part rides out onto the first section of powered roller conveyor. The operator then indexes the traversing cart so that the second section of powered roller conveyor is centered in front of the cabinet load door. The platen on this section of conveyor then

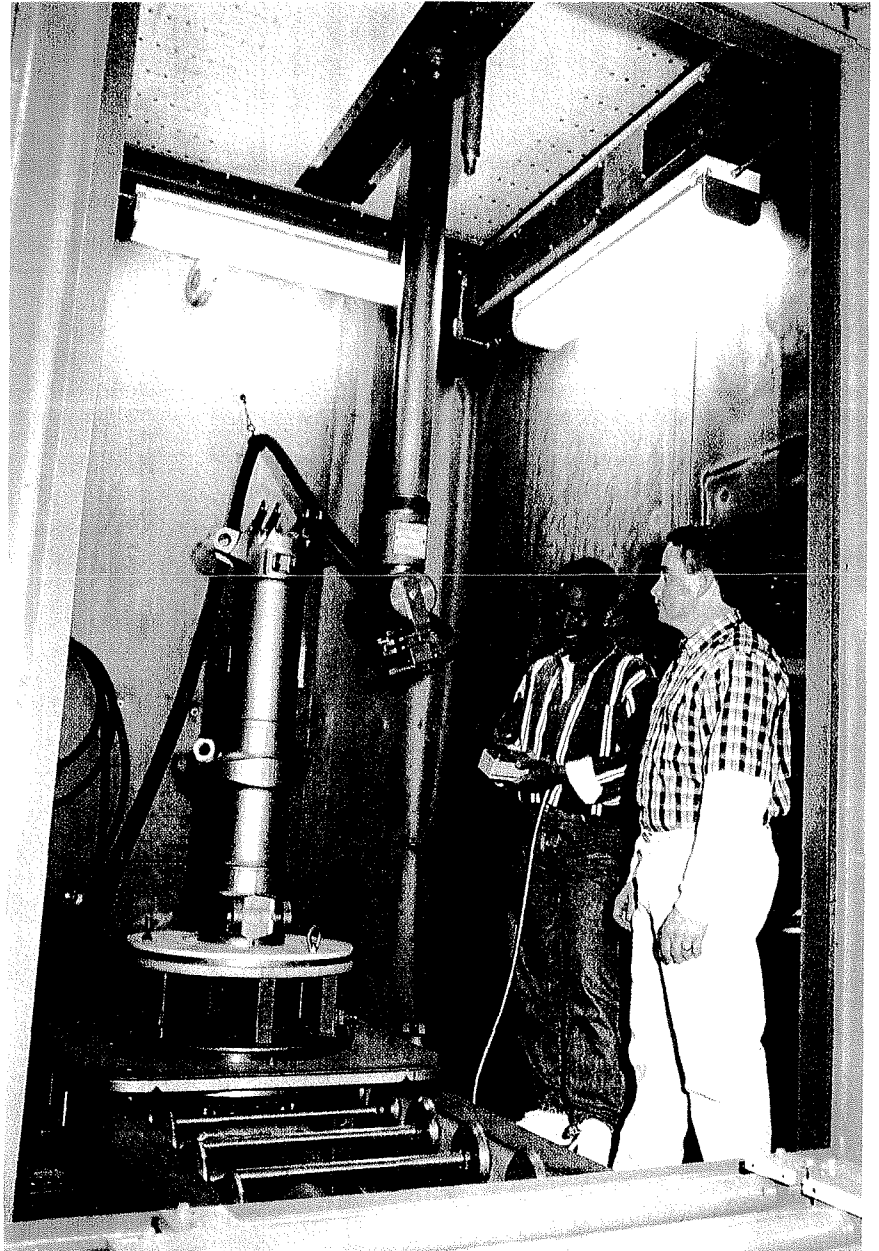
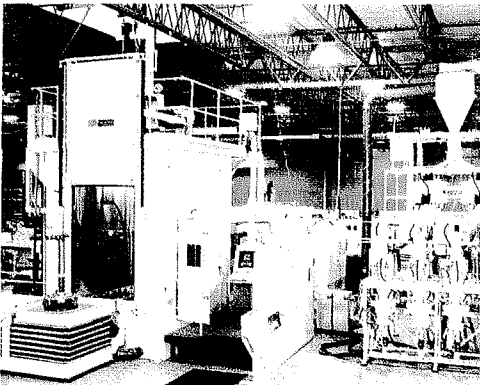
carries its part into the cabinet for processing. While the second part is processing, the completed part is removed from the conveyor and another part is loaded.

A hydraulically powered scissors lift has been built into the shuttle base. The operator can change conveyor height to work at the most comfortable position by simply raising or lowering this lift. Conveyors are 48" (1220 mm) above floor level when fully raised and 30" (762 mm) when fully lowered...they can be stopped anywhere within that range.

All shuttle conveyor motion is controlled by using a push-button panel located on the front of the shuttle conveyor. Safety controls and guarding meet all applicable safety regulations. ○



*These multi-axis, dual robotic shot peening machines are equipped with PRIMS™ software controls.*



*Robert Aponte and Darrell McKinley with the robot teaching box mode.*

# Compliance with AMS 2432 for State-of-the- Art Technology

In addition to solving the Navy's unique shot peening requirements, Progressive's machines comply with AMS 2432 due to NAVAIRNOTE 4870, dated May 30, 1989, that required compliance with AMS 2432 by June of 1994.

The U.S. Department of Defense has stated their intention to adapt, where practical, commercial or industrial specifications to replace military specifications. The Navy has taken the lead in this effort. The U.S. Army is the custodian of MIL-S-13165 (Shot Peening of Metal Parts) and has indicated that they may not maintain this document if suitable industrial specifications can be substituted.

In the commercial sector, some aerospace companies are seeking a common peening specification to simplify their purchasing and processing. MIL-S-13165 has been used in the past but it is no longer current technology. Many European aerospace manufacturers are already incorporating AMS 2432. ○



*Robert Aponte and Darrell McKinley from the U.S. Navy in front of one of the Navy machines. These machines were the largest Progressive Technologies has built and required the company to raise its roof to accommodate them.*