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Complete Assembly System for Sherwood

This machine was completely designed, assembled, tested, programmed and installed by DEPRAG USA, using standard DEPRAG assembly components such as Screwdrivers and Feeders manufactured by DEPRAG Germany. Since this is a special project, we believe that the customer's write-up speaks for itself and have inserted the relevant page out of the customer's Newsletter "The Globe", October 2002, Vol 3, Issue 2. Further details can be provided on special request! There are also several pictures of this system on the next page.

Sherwood's new K-SAM, semi-automatic valve assembly machine generates big productivity increases

Racetrack conveyor in lean work cell environment dramatically reduces exertion

For over 30 years, Sherwood has been providing post-style valves (K-Valves) to the medical industry for use in the distribution of life-sustaining gases such as breathable air and oxygen. Until recently, these valves were assembled by up to five people working independently, each performing all the operations necessary to complete each valve: loading components, using hand-operated screw guns to torque the components, and unloading the completed valves.

As a project in Sherwood's ongoing process improvement effort, a team was formed to evaluate potential improvements to the design and/or processing of the more than one million K-valves that are produced each year. Any improvements would have to allow Sherwood to remain competitive in a very cost-conscious market without sacrificing the company's long-standing commitment to providing its customers with a reliable, quality product. Individuals from Design and Manufacturing Engineering, Quality Assurance, Accounting, and Marketing met to discuss various ideas and, after several meetings, decided that the greatest improvement for the least expense could be realized by semi-automating the assembly process.

After performing several time and motions studies of the hand assembly process and considering the most feasible options available, it was decided that the best design for the K-valve Semi-automatic Assembly Machine (K-SAM) would be to have one valve on each of 15 pallets that move around a racetrack conveyor having two manual and three automatic stations. At each manual station, the pallet would automatically stop and an assembler would load some of the valve components then release the pallet to the next station. Each automatic station would use pneumatic screw guns to drive the components to their required torque. One automatic station would also feed and load, as well as drive, the smallest component, relieving the assemblers of that particular task. Fifteen pallets were included so that each of the five stations could be performing its function on one valve, with two waiting in queue. If any station needed to be shut down for a short period of time, the remaining stations could still run production and build a queue around that station. This would allow K-SAM to produce valves continuously while components are replenished or minor maintenance is performed.

At the same time the K-SAM was being built, Sherwood began investigating the feasibility of organizing other product lines into lean work cells. This timing presented an opportunity to integrate the new machine with the work cell concept. Along with developing the layout for the K-SAM, the implementation team was also devising ways to bring subassembly, testing, and packaging operations into close proximity and create a smooth flow of the product through the required operations.

Now, with K-SAM running and a smooth flow of parts through the cell, productivity has increased by more than 60%. Material handling is drastically reduced: stores personnel bring components to the first operations and remove finished product after packaging is complete with no intervention between operations. All movement within the cell is via direct conveyor to the next operation. This arrangement greatly reduces queue time and the amount of work in process within the Finishing Department. The product that is started today will be ready to ship by tomorrow morning.

Although the K-SAM has been operating for just a short time, the assemblers have readily adapted to the new methods of semi-automatic assembly and the amount of work in process has been visibly reduced. The people of Sherwood are now looking toward building on the success of this project and continuing their commitment to delivering products of the highest quality on time and at a competitive price. ■

Steve Cena

This view of Station 5 shows a K-valve, center of picture, ready to have a safety automatically loaded and driven to the required torque. The open, square hole in front of the K-valve is used when other style valves are assembled. With the pallet rotated 180° shorter style K-valves can be produced without having to make any adjustments to the K-SAM.

Picture Assortment: