



## **K2 Engineering Group Remanufacturing Program**

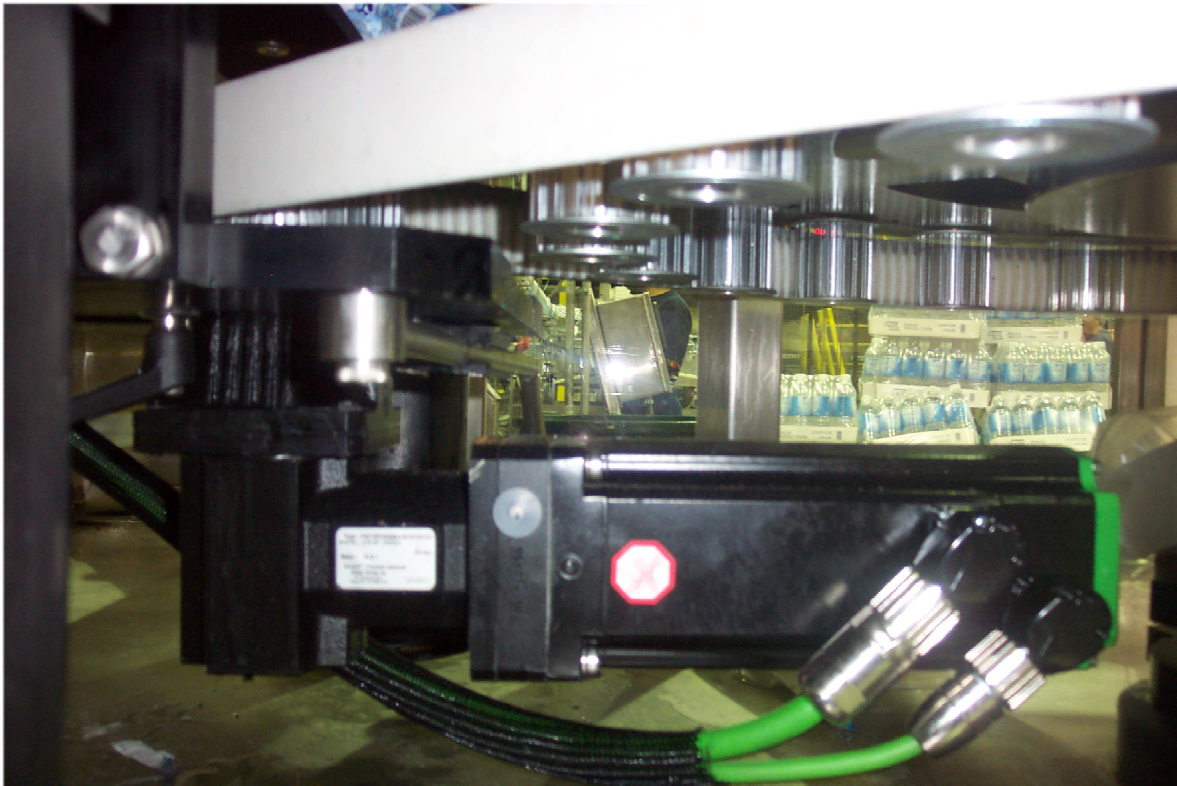
At K2 Engineering Group we take the word “Remanufacturing” several steps beyond the typical “Machine Overhaul” program offered by OEM’s. We began overhauling Kronos labelers 8 years ago, and quickly came to the conclusion that your basic “Overhaul” just wasn’t what our customers truly wanted. After several complete labeler overhauls we determined that what we really needed to offer our customers was a complete package to include overhauled components, but with improvements to bring their equipment to “state of the art” technology. We invested heavily in advances in technology as well as new concepts to improve performance, ease of operation and maintenance, reduced costs to operate and overall performance. We also looked at what could we do to make the labeling machine more flexible in the future. All the R&D proved to be exactly what customers wanted when they weighed remanufacturing an existing machine against purchasing a new labeler. The following is a list of some of the advances in our “Remanufacturing Program” verses a simple “Overhaul”:

- 1.) Over many years of experience in the labeling machine business one of the basic items we observed as a weak point to performance, quality and maintenance was how incoming containers were handled. Typically containers are held back from entering the infeed screw during idle times via a electro-pneumatic container stop system. This system relied on mechanical timing of the container into the first pocket of the screw, and was very inconsistent and caused damage not only to containers, but to the equipment as well.



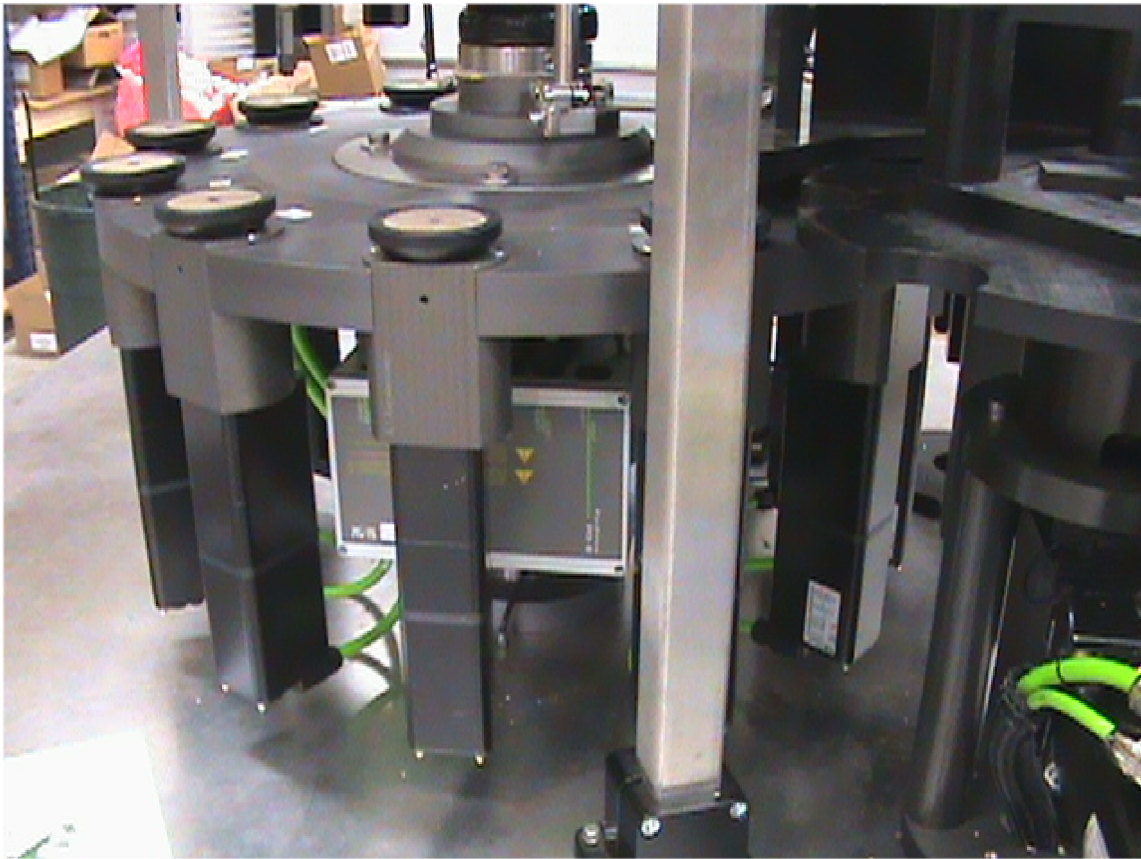
At K2 we eliminated this problem by simply redesigning the infeed screw drive system. The mechanical drive (gear/belt/chain) was removed and replaced with a servo motor drive. This allows the screw to remain primed with containers at all times. We simply electronically “declutch” the screw when the machine is in idle periods, and engage again when production is ready to resume. No container stop is required and all the high wear mechanical components are eliminated.

- 2.) On the cut and stacked hot glue labeling equipment the standard method of spinning the container for label application was to install timing belt pulleys on each bottle plate and drag the pulleys along a stationary belt. While this works, it produces high wear items and many containers simply cannot be matched in diameter to a mechanical pulley diameter. The speed of rotation is critical for consistent label application and the mechanical pulley system, in most cases was either too fast or too slow in the rotation speeds.



At K2 we developed a rotating belt system that is servo motor driven that allows us to dial the perfect rotational speed into the PLC for any container diameter. It reduces many mechanical wear parts, eliminates the need to change out pulleys for different container sizes, and improves labeling quality.

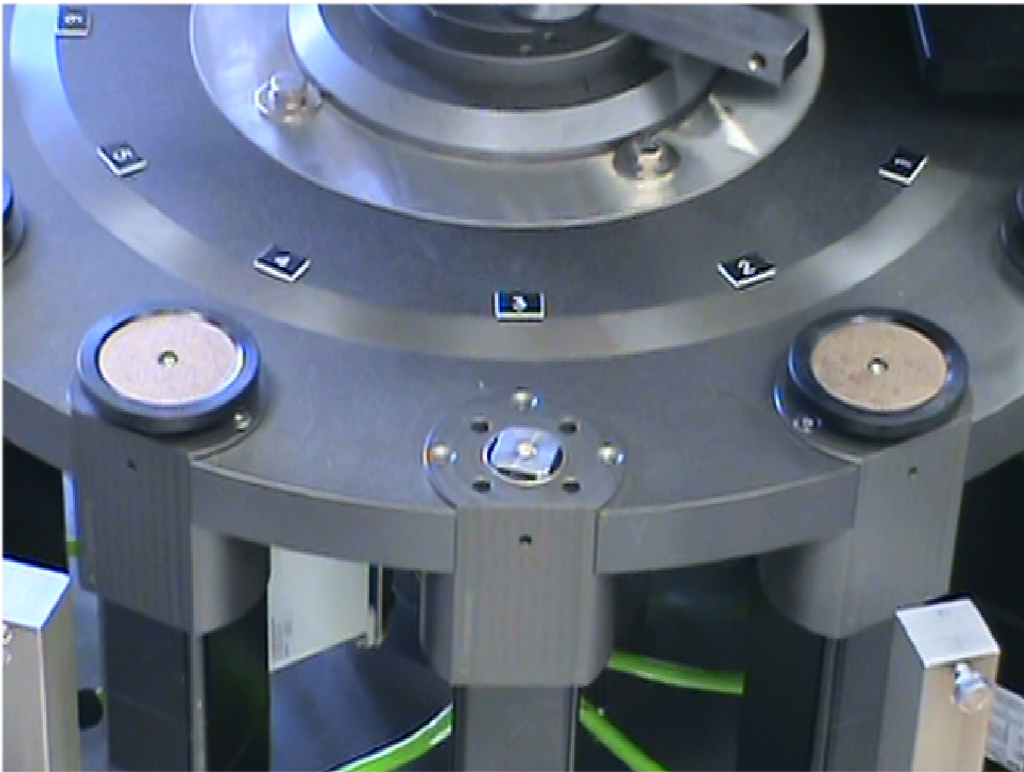
- 3.) On special applications for shaped bottles previous technology relied on mechanical cams to rotate the container for label application. While this works it is very limited to the various container shapes and sizes to be run and any future container applications. Either the entire machine cam needed to be replaced or cam segments had to be replaced on changeover.



We replaced this technology completely by designing a servo motor drive for every container plate on the container table. This eliminates any limit on container shapes and label configurations and allows us to simply call up a program from the PLC for a container or package changeover.

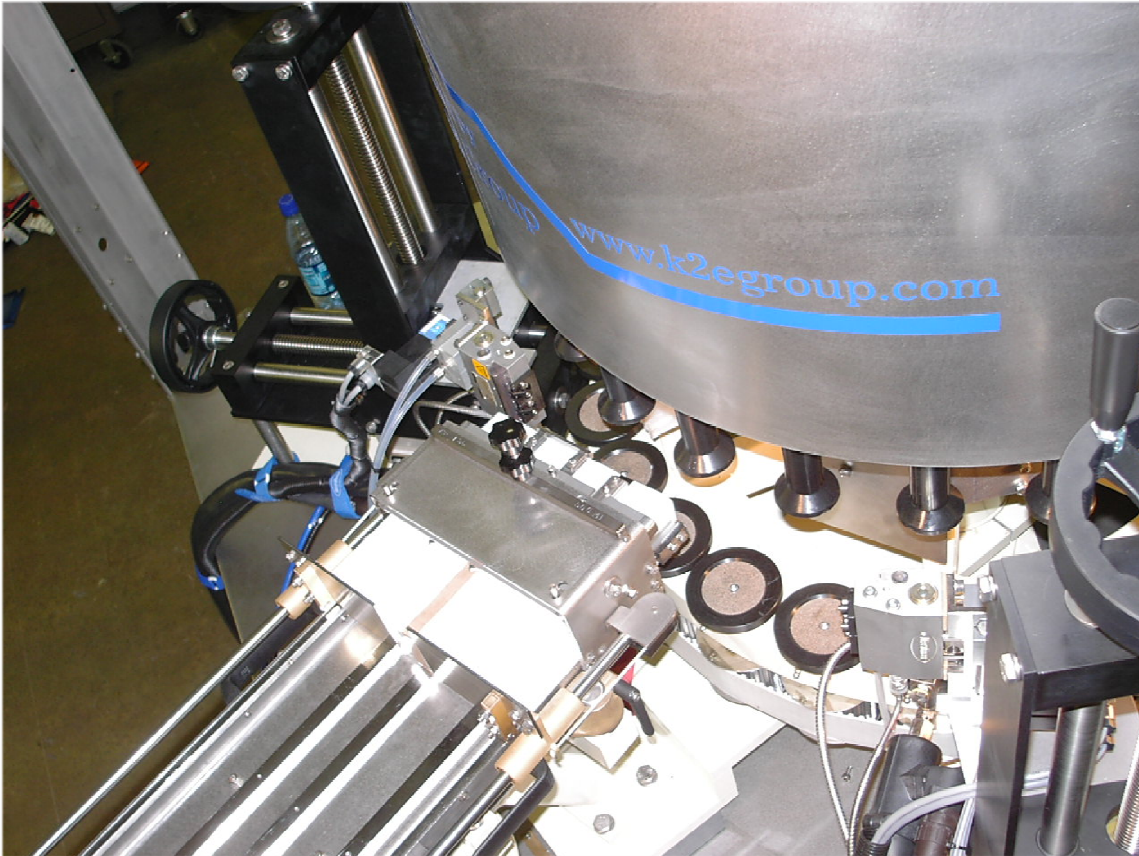


- 4.) In conjunction with the pulley conversion we also refused to believe that a container table couldn't be maintenance friendly. Typical industry designs require the customer to remove a labeler from production for 1-2 days to repair or rebuild the container table when bushings and/or bearings failed. It also required a knowledgeable maintenance technician to perform the repairs.



We redesigned the entire container table from scratch with the ultimate goal to have a reliable system that could be maintained in minutes, not days. A “CARTRIDGE” system was developed wherein each container plate is a cartridge and can be removed through the side of the table by simply removing 3 screws. The Cartridge's slide out the side of the table in seconds, and a new or repaired unit can be placed back into the table in minutes. A spare (or spares) can be held in stock and rebuilt on a work bench for future use.

- 5.) The conventional “Wheel Pot” hot glue adhesive application system was a priority to redesign and/or replace from our first overhauled labeler. This is a very high maintenance system with too many variables and adjustments. It is a high energy user, produces too much cleaning requirements and consumes excessive amounts of adhesive.



At K2 we spent many months developing a totally different adhesive application system in conjunction with the Nordson Corporation. It was our goal to eliminate all the variables and high maintenance issues, reduce the adhesive use and simplify the gluing process thus improving quality. To this end we have now integrated over 200 “SPRAY GLUE SYSTEMS” onto existing labelers as well as on our new labeling equipment. It has been so successful that it is our standard for our Summit and Everest lines as well as on our remanufacturing program for all roll fed and cut and stacked labelers. We continue to field retrofit the Spray Glue System onto existing labelers as well as onto remanufactured labelers in our shop.

- 6.) One of the downfalls of some of our competitor's labeler's is in their propensity to place "Proprietary Electrical" controls onto their machines (commonly called "black box" technology). This creates a dependency on the OEM for any electronic controls problems and creates confusion when troubleshooting the equipment. It also drives the cost of repairs and replacement controls items up to astronomical levels.



We decided we wanted to develop a controls design for our remanufactured and new equipment that relied on "OFF THE SHELF" components so that our customers could help themselves as well as find replacement components at industry standard prices. We continue to maintain this philosophy and have taken it through everything from machine controls, label detection systems, line control systems, etc.

- 7.) Our competitor's also manufacture limited pitch machines in limited models making it mandatory to purchase or rebuild a machine that is good for your initial requirements, but limited for any future needs. This requirement is based on the high cost of casting molds, etc.



At K2 we wanted to make equipment flexible for the future needs of our customers. To this end we designed our main components without castings and their inherent limitations. Our machine tables and head designs are manufactured from billet so we can match current pitch requirements and future needs. We have in the past refitted competitors labelers with different pitches so that our customers can run packages that previously could not handled on their equipment. These were pitches not available from the OEM but needed by the customer without having to purchase a new machine.