Alfa Laval ACE
Reduces Expansion Cycle Times by 50%

Featured: (From left to right) Nang Pau- Operator, Jason Black- Quality Inspector, Charles Rice- CU Team Manager, Randy Hall- Quality Manager, Gin Sing- Operator, Ryan Pitre- Manufacturing Engineer, Travis McCollough- Quality Inspector, Mark Gorgas- Factory Manager. (From bottom Left to right) John R. Scott- SU Team Manager, Dave Foster- Maintenance Team Leader

QUICK SUMMARY

The Challenge

- Current tube rolling system was primarily by feel and did not provide the expansion consistency they wanted.
- Too much time spent re-rolling to pass hydro.
- Stopping periodically to lubricate their expanders was time consuming.

The Solution

- Elliott's Hybrid Series Rapid Hawk with pneumatic motor and Direct Torque™ electronic torque control.
- Production trials to determine joint consistency, ease of operator use, and rolling times.

The Results

- Time savings of 50% per tube and a cost savings of ~$60,000 annually.
- Virtually zero tube leaks, reducing the number of man-hours attributed to re-rolling.
- Provided ± 2% variance from the target wall reduction.
- Significant time-savings from the through-the-cage auto-lubrication feature.
- Increased ergonomics reduced operator fatigue and strain.
- Increased tool life.

The Challenge

Alfa Laval ACE, located in Broken Arrow, OK, specializes in heat transfer, separation, and fluid handling technology. With a focus on producing quality air coolers for their customers, rolling consistency was of utmost importance. With their current tube rolling method relying heavily on operator feel to regulate the amount of wall reduction, the accuracy of wall reduction was lower than desired. This resulted in too much time spent re-rolling tubes.

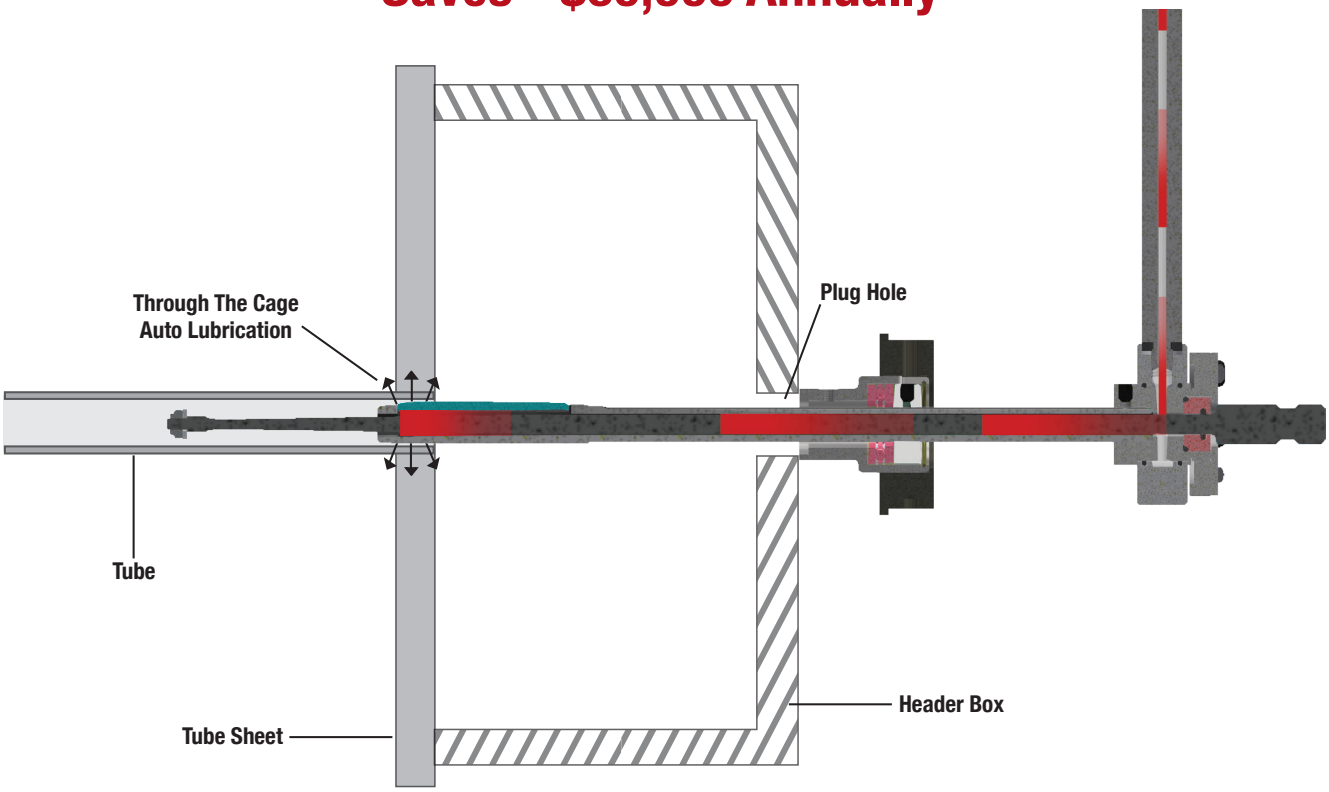
In addition to consistency, Alfa Laval was also looking for a method that would reduce the number of man-hours spent on a project. Due to their current tube rolling method, operators not only needed to regulate the amount of expansion taking place, they also had to stop periodically to re-lubricate the tooling. Operators would spend up to 1,350 hours annually lubricating tooling alone. Not to mention, this process was extremely messy and resulted in extra time spent cleaning up excess lubricant. Overall, this heavy reliance on operator care increased the amount of time and cost spent on a project.

The Solution

With roll consistency being of top priority, the Alfa Laval Team was eager to find an alternative tube rolling method. After numerous conversations with Elliott representatives, the Alfa Laval Team decided that the Hybrid Series Rapid Hawk could be the most comprehensive solution.

Elliott's Hybrid Series Rapid Hawk utilizes a pneumatic motor to provide fast cycle times for each expansion. While pneumatic motors are faster than electric, they tend to have challenges with consistency due to fluctuations in air volume or pressure. The Hybrid Series is able to help Alfa Laval achieve their goal of more consistency and less rework by utilizing Direct Torque™, an electronic torque control built into the Hybrid Series that can work with any motor regardless of its power source. Additionally, the Auto-Lubrication feature would greatly reduce the amount of downtime between tube expansions by providing lubricant through the cage directly to the rolls and mandrel during each expansion. Operators would also appreciate the Auto-Cycle feature, as it would reduce the amount of time and

Through The Cage Auto-Lubrication Saves ~$60,000 Annually



> *The Auto-Lube system has been huge, with a time savings of 50% per tube and a cost savings of ~$60,000 annually.*
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> *-Ryan Pitre, Manufacturing Engineer, Alfa Laval*

manual force required to insert and retract the expander from the tubes.

After receiving the Hybrid Series Rapid Hawk, Alfa Laval conducted several trials to determine wall reduction consistency, ease of operator use, and overall rolling cycle time.

The Results

The Hybrid Series Rapid Hawk produced positive results almost immediately. With roll consistency showing a significant improvement, Alfa Laval was pleased with the accuracy of the system. “We aim for an 8% reduction and the Hybrid Series gets us to that range so well,” said Ryan Pitre, Manufacturing Engineer. “The quality and roll consistency is so much better. It takes into account all variables and executes precisely.” The Hybrid Series rolled tubes within 2% of their target wall reduction every time, whereas their previous tube rolling method had as much as 6% variation. This increase in consistency significantly reduced the number of man-hours attributed to re-rolling tubes, with virtually zero leaking joints at hydro testing.

The Hybrid Series was also able to reduce the tube-to-tube expansion cycle time and the overall cost to complete a project. “The Auto-Lube system has been huge, with a time savings of 50% per tube and a cost savings of ~$60,000 annually,” Ryan said. Not only did the auto-lubrication system save man hours from lubricating tooling, it also significantly reduced the time spent cleaning up excess lubricant.

The Direct Torque™ control not only increased accuracy, but it also benefitted operators. The guesswork that was necessary with their previous tube rolling system was eliminated, allowing them to complete their job faster. Additionally, the Auto-Cycle reduced the amount of time spent between expansions by starting, stopping, and reversing automatically. It also reduced the amount of manual force required to complete a job: “It [Auto-Cycle] makes it so easy to use. It draws itself into the tube and pushes itself out, so virtually no operator force is needed,” Ryan said.

With the significant increase in accuracy and consistency, the Rapid Hawk Hybrid Series was able to help operators increase productivity. Overall, the Alfa Laval Team was extremely pleased with both the performance of the system and the support gained from the Elliott team. “Support was the reason we went with the Elliott equipment,” Ryan explained, “The product is great and the people we worked with have been great.”