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Electrical Feeder/Shear System Improves Productivity and Cuts Costs

Lynch Systems documents six-figure savings for customers

BAINBRIDGE, Ga., Aug. 2 - The latest generation in a family of Servo Feeder and Shear Systems for glass-forming presses has been introduced by Lynch Systems, a unit of Lynch Corporation (AMEX - LGL). The system uses electronic CNC technology to dramatically lower production costs of screens and funnels for computer monitors and televisions, tableware and glassware, and specialty industrial and optical glass, said Arnold Bowling, Lynch Systems president.

Lynch Systems has installed more than 150 of the systems in 100 manufacturing plants worldwide over the past 20 years, having continuously updated the product family as industrial-control and PC technology have advanced.

To illustrate and document the cost savings, the company has detailed a typical, hypothetical glass manufacturing plant operating eight production lines on three continuous, eight-hour shifts, seven days per week. Based on realistic assumptions, conversion from traditional, mechanical and hydraulic systems to the electrical system would save \$154,980 per year, Bowling said.

"Because of these production efficiencies and the resulting cost savings, these feeder and shear units replace mechanical and hydraulic feeders and shears every year," Bowling said, "and are becoming the industry standard. Customers also save money by minimizing downtime through reduced maintenance and parts replacement."

SYSTEM CONFIGURATION

The CNC control technology allows the customer to precisely control the shape and delivery of gobs (parisons) of molten glass fed into the presses, where they are formed into the final product. This is the source of the improvements to production flexibility because the gob shape and weight can be changed from one cycle to the next.

The Servo Feeder mechanism consists of a plunger stroke unit that is driven by ball screw, gearbox, and AC-servo motor. AC-servo motors power stroke and rotation, and are located directly on the Feeder mechanism.

Visual controls near the operator provide graphic display of the complete gob profile and the mechanical movements, allowing instantaneous changes to acceleration, deceleration, or stroke. These systems also incorporate a continuous self-diagnostic feature.

An electronic edit terminal facilitates control and changes. Based on a computer with Pentium processor, a color display graphically shows the main process parameters. The operator can change these parameters just by moving a cursor, with nothing to program. Furthermore, all modifications made to the program will be stored for ease of product changes and so that the article production will be safe and transparent.

For more information on the new system, contact Dick Robinson, Marketing Manager, Lynch Systems, Inc., 601 Independent St., Bainbridge, GA 39817. (229) 248-2305. dick@lynchsystems.com. www.lynchsystems.com

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Note to Editors: The cost-saving example referred to in the text of this release follows.

Assumptions

- Soda Lime Plant
- 88% good glass packed
- \$20,400/day to operate one line
- 12,773,376 articles produced annually
- Cost per article is \$0.63
- Selling price per article is \$1.05
- Operates 24/7
- 8 production lines
- 30 articles per minute
- Assumes line runs 350 days
- Variable cost is \$0.19/article

Given these assumptions, we derive the following possible benefits

Additional revenue per operating minute equates to	\$31.50
Additional variable cost per operating minute equates to <i>(variable costs for raw material and handling)</i>	<u>\$ 5.67</u>

Thus the additional benefit recognized for every minute

Operating versus set-up time avoided with electrical Feeder and shear system versus mechanical system is	<u>\$25.83</u>
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Further given these calculations we can now estimate the annual

Estimated time saved per Feeder job change	45 minutes
Estimated time saved per Shear job change	15 minutes
Total time saved - Feeder and Shear job change	60 minutes

Estimated increased profit per changeover <i>(calculated as \$25.83 * 60)</i>	\$1,549.80
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Estimated job changes per year	100
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Annual benefit from time saved on job changes	<u>\$154,980</u>
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Let us now offer detailed description on how these time savings are provided.

Feeder

Topic	Electronic System	Mechanical System	Benefits	Annual Savings
<u>Flexibility</u>				
Produce up to 3 articles simultaneously	Can do automatically through programming for 3 separate profiles without any downtime provided no change in orifices.	Can not do more than one article at a time. Require different needle cams	7.5 minutes job change for each article. Additional one hour to allow for gob shape adjustments. Typical Tableware line averaging 100 changeover's per year.	\$ 19,373
Diagnostics	Allow for immediate measurements, controls, and faults to quickly decipher problem and correct. Records log of operator intervention.	No automatic feedback on performance and ability to determine cause of problem without visual inspection.	Unplanned downtime can be very costly. Ability to quickly locate and correct problem will increase productivity.	Savings not quantified. Would be in addition to savings depicted here.
<u>Job Changes Minimized</u>				
Quicker job change	Start immediately with change in profile re-called from computer without having to stop machine.	Requires full rotation to be completed on roller cam to start job change. This is in addition to changing roller cam manually with each job-change.	1 Cut saved on eliminating a full rotation in addition to 7.5 minutes quicker start-up.	\$ 19,373
Reliance on cam settings (markings) and human intervention with regard to cam settings	No marker is needed to set profile i.e., no cam settings required due to no cams. The profile is saved in memory on the PC and/or PLC. Data input is already defined in computer.	Operator needs to find marker on cam to re-set cam to article production. Human error is possible through unfamiliarity with cam markings and incorrect set-up	With electronic version the data profile and set-up are recalled from PC memory, reviewed, and inserted before the required article changeover. Human Errors are mitigated. Estimated savings is 0.5%-1% of production availability.	Savings not quantified. Would be in addition to savings depicted here.
Height and Stroke of Plunger	Stored in memory on PC and called up and inserted via PC on job change over. Settings are adjusted automatically with use of proximity switches.	Dependent on operator knowledge and skill on mechanically setting the height and stroke. Must be performed manually.	No manual adjustment needed for electrical system when adjusting the height and stroke of the plunger. Save 22.5 minutes per job change.	\$ 58,118
<u>Repeatability</u>				
Control of Gob Profile	CNC controlled to high degree of repeatability to minimize gob weight	With mechanical systems there are invariably lost gobs	With precise control and feedback, acceptable glass rate is	\$ 19,373

	fluctuations.	due to mechanical wear and tear and malfunctions causing gob weight variability.	improved with electrical system. Decrease in time from each job changeover is estimated at 7.5 minutes.	
Stroke Adjustment	Can be adjusted automatically via PC and/or PLC to within 1/100mm.	Can be adjusted manually while running, but no automatic feedback or archiving.	With precise control and feedback, acceptable glass rate is improved in electrical system.	Savings not quantified. Would be in addition to savings depicted here.
Plunger rotation - improves homogeneity in glass.	A rotating plunger can be added and utilized and programmed with electronic feeder.	Mechanical feeder can not utilize rotating plunger.	Quality and thus pack rate are significantly improved with glass homogeneity being controlled and maximized.	Savings not quantified. Would be in addition to savings depicted here.

SHEAR MECHANISM

Job Changes Minimized

Quicker job change	Start immediately with change in profile from computer input.	Requires cam change and full rotation to be completed on roller cam to start job change.	With electronic system no need to stop production as stroke and speed are adjusted automatically and there are no cams involved. As typically the same person changes both the cams on the feeder and shear, savings would be about 5 minutes per changeover.	\$ 12,915
Bumper (knocker) guide	None needed therefore no time required for changing and adjusting gob drop accuracy.	Need to replace different size guides and adjust the guide just right for the new article being produced.	Additional time in replacement of bumper guide is estimated at 5 minutes per job change. Additional time is lost with mechanical system having to adjust the guide to running conditions. No cost outlay to purchase or manufacture guides are needed for electrical system as well. Total estimated savings are	\$ 19,373

			computed as 7.5 minutes per job change.	
<u>Flexibility</u>				
Adjust arm	Electrical system allows adjustment of one arm for tuning cutting. Different speed and stroke adjustment for each shear arm.	With mechanical system no adjustment is possible of the arms	Savings are the same as adjustment for the bumper guide and are included in the quantified amount above as well.	Included in savings above.
Independence of Shear from Feeder	Feeder and shear are run independently. For longer gob drops and speeds you can automatically reduce the speed of the feeder but still maintain faster speed of cutting shear without stopping.	With mechanical unit the speed of the feeder and shear are both dependent on the speed of the mechanical feeder	Set up time and change over speed is improved with electronic version. Further, the quality improves on the electronic as with slower drop gobs the shear speed can be maintained producing better acceptable production rate.	Lynch in discussion with several glass manufacturers believes the improvement in quality glass can be as much as 10-30%. The savings are not quantified here and would be in addition to the savings depicted here.
Automatically adjust shear profile	Once programmed the shear profile (acceleration/deceleration) can be adjusted by point and click on PC mouse.	To adjust the profile the mechanical cam must be changed requiring stoppage of the shear.	With electronic system, job changes and adjustments are reduced due to real-time adjustments made in profile. Estimated savings are 2.5 minutes per job changeover.	\$ 6,458
<u>Repeatability</u>				
Speed of Shear	Quick (150 cpm) and precise (1/10mm) cutting.	Limited to speed of roller cam and dependent on speed of feeder.	Reduction in shear marks improve percentage of good glass.	See estimated improvement in glass quality within "Independence of Shear from Feeder" category included above.

