The Westland Corporation

PROCESSOR

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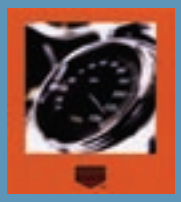

A Smooth Ride With The Right Tools

Dave Larson, President of Westland Corporation

Everyone likes things to run smoothly, whether it is a business trip, remodeling project or a processing job. As with any project, having the right tools will go a long way toward eliminating the “hassles” that inevitably appear.

Westland is committed to providing you with the tools for a “smooth ride” process when you turn the heat on.

Worn components can make for a rough ride. Inside this issue you will learn what contributes to wear and how it can affect your bottom line.

Education is a key tool in obtaining a smooth ride. Through publications such as this newsletter and our Cylinder & Screw Handbook, we hope to help you keep up with the ever evolving world of plastics processing.

Quality products designed specifically for your process are also excellent tools for processing success. We are not just another screw and barrel supplier. Westland wants to understand your process needs in order to provide you with the optimum screw and barrel design.

We urge you to use our combined years of processing experience as a tool for improving your production. Why not challenge us with your most perplexing processing issue? We welcome the opporunity.

A Smooth Ride When The Heat Is On

Plan Now To Visit

Westland Corporation

at NPE 2006
June 19-23
McCormick Place
in Chicago

Booth 4336

DO YOU KNOW?

Maglev trains are a technology yet to be experienced worldwide. Maglev is short for magnetic levitation. This train differs from a conventional one in that it doesn’t have an engine. Instead of using fossil fuels, the magnetic fields created in the guideway walls and track propels the train. This force allows the train to levitate between 0.39 and 3.93 inches above the guideway.

Do you know how the speed of a maglev train compares with a Boeing-777?

Answer inside.

PROCESSING CONSIDERATIONS

Improper Procedures Can Contribute to Component Wear

Start-up and shut-down procedures are a key factor in preventing broken valve tips and screws. Moreover, if these procedures are not followed properly, they can contribute to adhesive, abrasive and corrosive wear. Component wear not only affects processing, but profits through lower production rates, higher reject rates and down time.

The areas of processing which have a significant effect on component wear include: 1) Start-Up and Shut-Down Procedures; 2) Moisture Removal; 3) Heat Profile; and 4) Back Pressure. By following certain guidelines, screw and barrel life is not only extended but optimized to bring your company high efficiency processing which flows straight to your bottom line.

Start-Up and Shut-Down Procedures

Cold Start Ups – The failure to adequately allow heat to "soak in" before any screw rotation can result in breaking valve tips and screws with related potential scoring or galling of the barrel lining.

Excessive "Soak In" Time – Allowing the screw and barrel to sit idly at operating temperatures for extended periods of time contributes to potential corrosive wear. The attack of chemicals and acids in the resins upon screw and barrel surfaces is accelerated if resins are allowed to heat too long during start-up.

Improper Shut-Down – The problems referred to in 1 and 2 are more likely to occur if improper shut-down procedures are permitted. The failure to properly purge the unit and leave the screw in the forward position exposes the components to corrosive wear and increases the possibility of damage due to cold start-ups. Please refer to your material manufacturer's processing guide for start-up and shut-down procedures.

Moisture Removal

It is well known that moisture must be removed from most resins prior to processing to avoid streaks, splay or bubble formation in complete parts. Except for polystyrenes, polyethylenes and polypropylenes, resins should be dried and/or vented. Inadequately dried material, when processed with high temperatures and long residence times, can result in material degradation and corrosive wear in the barrel and screw. This is especially true of materials that are corrosive due to their chemical make-up, such as PVC, POM, FEP, and the cellulosics.

Heat Profile

The heat profile of conductive heat generated with heater bands is probably the most important and perhaps least understood factor in successful plastics processing. An incorrect heat profile is the single most important cause of wear in barrels and screws!

Back pressure should not be a substitute for a proper heat profile or correct screw design.

Why? Because the natural tendency is to cool down heater bands when a heat override condition occurs. Since most heat overrides are caused by excessive shear heat, the best way to decrease shear is to apply more, not less, conductive heat. It is the uncontrolled, excessive shear of material that causes most abrasive wear and, through melt blockage and deflection, causes adhesive wear.

Heat Sources – The heat required to melt the plastic in the barrel is developed from two sources; conductive heat from heater bands and shear heat.

Shear Heat - Shear Heat results from the screw working the plastic against itself, the barrel wall and the screw surface. Shear heat is also produced by the use of back pressure and various mixing devices near the end of the screw. Some shear heat is essential to achieve a uniform melt quality, both in temperature and viscosity.

If shear is the principal or only heat source, the melt temperature will be high but achieved at the expense of higher energy cost, greater potential for material degradation and significantly increased barrel and screw wear. Experience indicates that heat developed from the two sources in approximately equal amounts (assuming a shot of 30% to 70% of shot capacity) produces the best results.

IMPORTANT NOTE: We suggest that you measure the energy required to rotate the screw motor during screw recovery. Typically, shear heat should be derived from 40% to 60% of the available energy. Greater energy indicates potentially excessive shear while lower pressures would suggest too little shear.

Setting the Heat Profile – Achieving the proper heat profile is as important a factor as balancing the heat source. Although an "ascending" profile is used successfully in some situations, the experience of our customers has confirmed that the use of a "hump" or "reverse" profile produces an optimum melt quality at the lowest cost plus screw and barrel wear is minimized.

A previous issue of the Westland Processor newsletter dealt with selecting barrel heat profiles. Contact us for another copy of that issue.

Back Pressure

Back pressure results from restricting the backward movement of an injection screw during the recovery portion of the molding cycle. As a result, the screw works the resin harder and increases the melt temperature of the plastic through increased shear. It is possible to raise the melt temperature as much as 50 degrees or more through the use of back pressure.
(Continued on page 4.)

Westland Cylinders
A Smooth Ride ... When The Heat Is On

WEAR ECONOMICS

Wear Contributes to Loss of Profit

Wear in a barrel, screw or valve can contribute to lower production rates (increased cycle times), higher product reject rates and down time, all of which result in loss of profit. The economic impact of these deviations from "bench-mark" production can be significant and provides the basis for repair or replacement of one or more of the components.

The table below illustrates this statement. It is based on the following assumptions for injection molding:

• 300 ton, 30 ounce capacity, 65mm bore diameter injection molding machine with a four-cavity mold with hot runner system. Each part weighs 71 grams (284 gram) shot (10 oz). Material cost is $0.40/lb.

• "Bench-mark" production rate is a 15 second cycle for a 24 hour/day, 26 days/month operation, at $45 per machine hour. A 5% reject rate is standard with worn screw and barrel. Machine operates approximately 90% of available time.

This "Production For One Month" illustration depicts how significantly an improvement in cycle time and reject rate can affect processing profitability. The "multiplier" effect of producing more good parts in the same number of machine hours is considerable because most costs are "fixed". The impact is even greater if higher priced resins are used, especially for improvement in reject rate.

If your operation has worn barrels and screws that are causing less than expected production of good parts, repair them or replace them. The return on investment is probably the greatest of any investment opportunity in your company!

Improve Profits and Productivity

REBUILD WORN SCREWS

Worn Screw

Westland Rebuilt Screw

Send Your Worn Screws to

Westland Corporation

After a complete inspection, you will receive a quote for any needed repairs.

Call Westland at **800-247-1144** for further details.

PRODUCTION FOR ONE MONTH

	"Bench-Mark" Rate	With Improvement In Cycle Time 1 Second	With Improvement In Rejects 5% to 1%	With Improvement In Both
Total Plant Hours	624	624	624	624
Total Machine Hours	560	560	560	560
Parts Per Hour	960	1,028	960	1028
Less – Rejects	(48)	(51)	(10)	(10)
Good Parts Per Hour	912	977	950	1,018
Total Good Parts	510,720	547,120	532,000	570,080
Material (lbs / part)	.1563	.1563	.1563	.1563
Total Materials Used (lbs)	(a) 84,027	89,979	84,027	89,979
Sales (b)	$ 76,608	82,068	79,800	85,512
Costs:				
Materials	33,611	35,992	33,611	35,992
Machine Operation	25,200	25,200	25,200	25,200
Operating Expenses (c)	15,322	15,322	15,322	15,322
Total Costs	74,133	76,514	74,133	76,514
Profits (Loss)	$ 2,475	5,554	5,667	8,998
Profit Improvement		$ 3,079	3,192	6,523
Percent Improvement		124%	129%	263%

(a)Total machine hours 560 x parts per hour 960 = 537,600 parts x .1563 = 84,027 lbs.
(b) Approximately $.15 per part which includes a 3c / lb. markup on materials.
(c) Approximately 20% of "Bench-Mark" sales.

DO YOU KNOW: Maglev trains float on a cushion of air, eliminating friction which allows them to reach ground transportation speeds of more than 310mph. In comparison, a Boeing-777 commerical airplane can reach a top speed of approximately 562mph. (From travel.howstuffworks.com website)

Dave Larson (shown with his wife Debbie) was recently inducted into the Plastics Pioneers Association. This Society has two objectives - friendship and education. Since 1985, over $300,000 in scholarships from this organization has been awarded to university students studying plastics related courses. Congratulations Dave.

Be sure to visit with Terry Williams and Randy Wise at Westland's booth #4336 during this year's NPE in Chicago from June 19-24.

For more information on component wear - contact

Westland

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AVAILABLE PREVIOUS ISSUES OF THE PROCESSOR NEWSLETTER:

Vol 1 Issue 2 - **Barrel Heat Profiles**

Vol 1 Issue 3 - **Measuring Wear**

PROCESSING CONSIDERATIONS

Continued from Page Two:

Advantages of Back Pressure-Shear heat creates a more uniform melt temperature and viscosity. In a proper amount, back pressure helps create a better melt quality with improved flow characteristics and potentially better part quality. Back pressure can also enhance the mixing of color and increase melt density, which can also improve part quality. Fine tuning of the plasticating process is possible through back pressure when the proper screw design is not available.

Disadvantages of Back Pressure- Back pressure increases melt temperature, restricts the recovery of the screw and can lengthen cycle times. Due to the screw working harder, more energy is consumed increasing the cost of production. Excessive back pressure will result in increased wear of barrels, screws and valves. Plus, if used with glass reinforced resins, may cause the breakage of the glass fibers reducing the physical properties of the part.

There are no hard and fast rules for the use of back pressure. A little back pressure helps the molding process without sacrifice in part quality or cost of production.

In any processing environment, back pressure should not be a substitute for a proper heat profile or correct screw design.

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