The Westland Corporation

PROCESSOR

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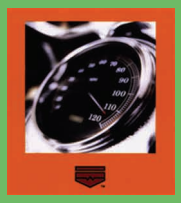


HIGH PERFORMANCE

Dave Larson
President


Dave Larson

Today, leaders in the plastic processing industry are continually seeking new and innovative ways to remain competitive while improving profitability and efficiency. We all should be trying to squeeze every ounce of productivity out of our existing processes by finding ways to increase production through improving our practices and procedures.

The common phrase "if it isn't broken don't fix it" doesn't equate to processing at peak, high performance.

The word "fix" is one of those American words that has several meanings. One definition is to be in a difficult situation or predicament. Nobody likes to find themselves in a "fix", but that situation usually demands action, which hopefully improves the circumstance.

"Fix" can also be defined as influencing the outcome of a situation.

Then there is the southern phrase "fixing to" which is commonly used to describe a situation when one is on the verge of or preparing to take a particular action. Just "fixing to" do something has good intentions, but doesn't guarantee accomplishment.

Why Not Make It Better

Are you someone that subscribes to the idiom: "If it isn't broken, don't fix it"? If so, I would ask you … "Why not make it better?"

If "why not make it better" becomes your mode of operation, surprising results can occur. But that takes a willingness and desire to seek out ways to improve your production, even if it means fixing something that isn't broken.

To look at this from a processors view, do you even know if your process is in a "fix" or not? Could it be improved? In this issue we focus on when a screw and cylinder should be replaced, either due to wear issues or design improvements. Why not look at what the return on your investment would be if processing with a screw designed specifically for your process and resins?

What previous "fix" to your process has influenced the outcome of your production, for better or for worse?

Are you always "fixing to" start that preventive maintenance program or look into a special screw design?

Westland Corporation is committed to helping you become not only a good processor, but a great processor. We offer high performance components, backed by high performance customer service and processing assistance.

Why not call us today to discover the ways Westland can help **make your production and profits better**.

99% Performance Guarantee

Americans consume 54 quarts of popcorn per man, woman and child each year. Approximately 70 percent of that is purchased at retail stores in both raw and popped form, and eaten at home.

Although the early Indian corn carried no popping guarantee, popcorn brands today vow at least 99 percent of the kernels will pop. The key is a constantly improved product. Throughout the years, popcorn processors have implemented significant hybrid popcorn seed research to continually enhance their product.

Do you know what makes popcorn pop? Answer Inside

Dave Larson, President with Dwayne Murray and Dan Johnson, Vice President

Dwayne Murray Receives 20 Year Award

Dwayne Murray was recently recognized for twenty (20) years of dedicated service to Westland Corporation. During this time he has taken on the task of operating and mastering most of the equipment utilized in the screw department.

Currently Dwayne completes a thorough inspection on all incoming components in order for our sales engineers to provide accurate quotes to our customers. He also completes the final inspection on orders prior to shipment.

Dwayne is another example of how our experienced people truly make the difference in the quality components you receive from Westland.

How Worn Is Worn ... or WHEN SHOULD YOU REPLACE A WORN SCREW?

(Learn More on Back Page)

Westland Corporation will be exhibiting at

PLASTEC '08

January 29-31, 2008

Anaheim Convention Center
Anaheim, California

Booth 3981

Be Sure To Stop By Our Booth To Discuss The Latest In Screw And Cylinder Technology

WHEN IS IT TIME TO REPLACE YOUR BARRELS & SCREWS?

Knowing Processing Objectives Is The Key

The time to replace barrels and screws is the point at which those components **no longer allow the processor to accomplish their processing objectives**. A barrel that is worn to a moderate degree may allow the molding of a black flowerpot with a viscous material, thereby accomplishing the molding objectives. The same barrel would not allow that processor to mold an intricate part that demands dimensional accuracy in a variety of colors that must match color specimens. Even if the barrel and screw are not worn, the processing objectives may not be met with the screw or barrel that is on the machine.

Processing characteristics of the materials have an important impact

Processing objectives for the injection or blow molder may be expressed in the Set-Up or Process Sheet. The **cycle time, part weight, color ratio and other factors** directly relate to the economics of the manufacturing process. If these specific objectives are not met, the profitability of the operation is compromised. This is true whether the processor is a captive molder making parts for assembly into a larger product, or a custom molder who is supplying parts to a customer at a specified price per thousand. The objectives of an extrusion process are relatively the same. The quality of the extruded part and the production rate clearly relate to the economics of the run.

The ability of the screw and barrel to satisfy the processing objectives is dependent upon two factors: (1) **degree of wear**, and (2) **design suitability**. A new screw that has not been designed to accomplish process objectives is just as critical as a barrel that is worn beyond the limits of acceptability. Although many processors are sensitive to the degree of wear of a component, the suitability of the design of the barrel or screw is just as critical. Although the mechanical design of the barrel is a function of the original equipment manufacturer, the type of barrel lining is a design consideration.

Degree of Wear

There are no magic numbers that dictate the maximum amount of wear that may be permitted before a barrel or screw should be repaired or replaced. The guidelines provided by most component manufacturers are an attempt to advise their customers that there is a practical limit to the amount of wear that would allow satisfactory processing to take place. (See Westland's recommendations on the back page of this issue.)

It is safe to say the processing characteristics of the materials being molded or extruded have an important impact on the degree of barrel/screw wear that may be acceptable. The greater the viscosity of the material being processed, the less the impact of wear on the production rate. However, another important fact must be considered: **Many highly viscous materials are also sensitive to heat and shear**. ABS, acrylic, PVC, PC are among those materials that have greater than average melt viscosity and are either heat or shear sensitive. The gap between the barrel wall and the screw flights in a worn set of components has been proven to cause greater frictional heat and shear that can result in part quality that is not acceptable. The parts may be produced but their quality may cause them to be rejected.

The acceptability of the degree of wear for a barrel and/or screw is simply dependent upon how well those components satisfy the processing objectives rather than solely on the measurement of the barrel/screw clearance.

Design Suitability

When the question is asked "When should I replace my barrel or screw?", the answer is usually based on the degree of wear of the components. In recent years, however, there is a

greater understanding of how important: (1) the screw design and, (2) the material used for the screw and the lining of the barrel is to successful processing. It really doesn't matter whether an unsatisfactory cycle time or production rate is the result of excessive component wear or caused by an incorrect screw design. The result is the same. **Processing objectives are not being met!**

Screw replacement does not necessarily mean that the previously used screw must be repaired or discarded. The screw may even be new and yet not suitable for a particular processing application. Molders know how difficult it is to successfully process ABS or acrylic with a screw that has a high compression ratio and a short transition zone. Yet the same screw may be adequate for processing nylon or polyethylene.

Processors who mold or extrude fluoropolymers know that a new barrel, lined with a very resistant material, may fail horribly in satisfying their objectives. The hydrofluoric acid that can develop in processing those resins attack and corrode screws and barrel linings unless they are made from iron-free and/or nickel-based materials. Even though the components may be new and resistant to abrasive wear, their material composition is simply not suitable for the particular process.

The processor who is molding a part requiring the addition of a colorant may find that his metering screw will not achieve adequate color mixing. The result is a high rejection rate of parts that do not meet the color specifications. Is the screw worn? No. Its design is simply not suitable to achieve part acceptability. Very likely, a good mixing screw will accomplish the desired result.

Establishing the Objectives

"When is it time to replace your barrels and screws?" The answer, simply stated, **is when they don't get the job done**. They may be worn beyond acceptability or their design may not be suitable to the processing requirements. In either case, the processing objective is not being satisfied.

How do you know when they are not getting the job done? ***Performance measurement against documented objectives***. The objectives should be clearly indicated on a Set-Up Sheet or Process Sheet that was established when the machine (extruder, injection or blow molding) was in proper repair and the barrel and screw were within OEM tolerances. All of the data relative to the part, the mold, the material being used, the colorant and color ratio, and other additives, should be known. The preferred screw design and the composition of the barrel lining should be indicated. Processing information for the optimum set-up, including barrel temperatures, pressures (including the screw rotate pressure), times (especially the screw recovery time), RPM and other measures should all be established. Finally, there should be an indication of the level of acceptability of the ratio of rejected parts to total production and the percentage of down time incurred.

Monitoring Performance

Whether using a monitoring system or generating the information by reading the instrumentation and recording the data, the performance of the process should be measured against the process standards (from the Set-Up or Process Sheet). These process standards may be referred to as the Production Benchmark. Any significant deviation from the benchmark will indicate that a processing problem exists. A study of the deviation should include an assessment of the adequacy of the barrel and the screw. The key question is then, "Is the deviation the result of excessive wear or the lack of suitability of the design of these components?" If the answer is yes to either question, that is **the time for you to replace your barrel and/or screw.**

VALVE WEAR

Don't Overlook This Important Factor

The value of a properly functioning non-return valve is probably the most overlooked and underestimated factor in injection molding. The problems associated with non-return valves and their causes can be summarized in the chart below.

PROBLEM	CAUSE
Cracked Ring	Excessive cylinder wear in stroke section, or unmelted plastic lodged under ring against rear seat (poor start-up and shut-down)
Broken Stud	Improper start-up and shut-down procedures (Failure to run screw with no feed at shut-down or making a cold start-up)
Slow Recovery	Excessive wear on the front seat and ring slowing the passage of melt forward and recovery of screw (Can be caused by excessive back pressure on screw)
Failure to Hold a Cushion	Excessive ring, rear seat or cylinder wear, worn or eroded ball or ball seat (Allows plastic to flow back through valve during injection and hold cycle and screw rotates backward)
Erratic Part Quality	Worn valve components, ring seats or ball and ball seats (Can cause defective parts resulting from incomplete shot)

Guidelines For Replacing Valve Components

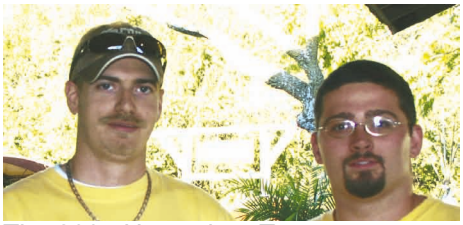
Although there are no absolute rules on the replacement of valves, the following is a guideline or good "rule of thumb":

If the non-return valve is damaged, ring cracked, or exhibits wear visible upon inspection (or ring O.D. worn equal to OEM screw flight clearance), replace the worn components or the entire valve.

Answer to what makes popcorn pop:
The kernels contain a small amount of water stored in a circle of soft starch inside the hard outer casing. When heated, the water expands, creating pressure within, until eventually the casing gives way, and the kernels explode and pop, allowing the water to escape as steam, turning the kernels inside out.
From the Popcorn Board website: **www.popcorn.org**

WORN COMPONENTS

The winners of the Westland 2007 Annual Golf Tournament were (l to r) Adam Christie, Maintenance; Dwayne Murray, Inspection; Kim Murray; Kathy Hampton, Marketing; and Dan Johnson, Vice President



The 2007 Horseshoe Tournament Champions at the annual company picnic were (l to r) Shawn Graves, PTA Operator and Matt Houk, Machinist.

How Much Wear Justifies Repair or Replacement?

Two separate and independent studies have clearly indicated the importance of repairing worn cylinders and screws. Both studies indicated that when the flight/barrel clearance is doubled, the drop in production rate can be as high as 20 to 25%.

Follow our rule: “If the combined cylinder/screw wear is twice the total clearance (see chart below), the cylinder or screw (or both) should be repaired or replaced.”

METRIC SIZE	MAXIMUM CYLINDER ID	MINIMUM SCREW OD	TOTAL CLEARANCE*
30mm	1.182”	1.175”	.007”
35mm	1.379”	1.372”	.007”
40mm	1.577”	1.568”	.009”
45mm	1.774”	1.765”	.009”
50mm	1.971”	1.962”	.009”
55mm	2.167”	2.158”	.009”
60mm	2.364”	2.355”	.009”
65mm	2.561”	2.552”	.009”
70mm	2.758”	2.749”	.009”
80mm	3.152”	3.142”	.010”
90mm	3.545”	3.533”	.012”
100mm	3.939”	3.927”	.012”
105mm	4.136”	4.122”	.014”
115mm	4.530”	4.516”	.014”
120mm	4.726”	4.712”	.014”
135mm	5.317”	5.301”	.016”

* Total Clearance divided by 2 equals clearance per side.

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