

Visi-Trak[®]

SENSE, MONITOR, CONTROL

SENSE, MONITOR, CONTROL

We will begin shortly:

Call using your telephone and this dial-in information →

**Replacement Valves,
Manifolds, and
Control Packages
for Die-casting**



Retrofit Options

Available Conversions

Throttling Manifolds with:

- Standard slip-in Cartridge Valves or
- Inline Valves



For These Manufacturers

- ACV Lester
- EPCO
- HPM
- IDRA
- Prince
- Toshiba
- Wolniak
- More...

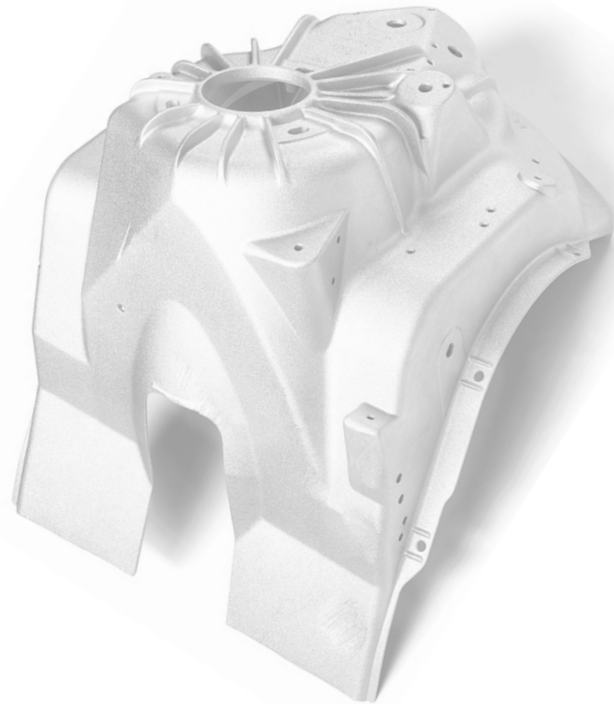
Visi-Trak[®]

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What will we be covering today?

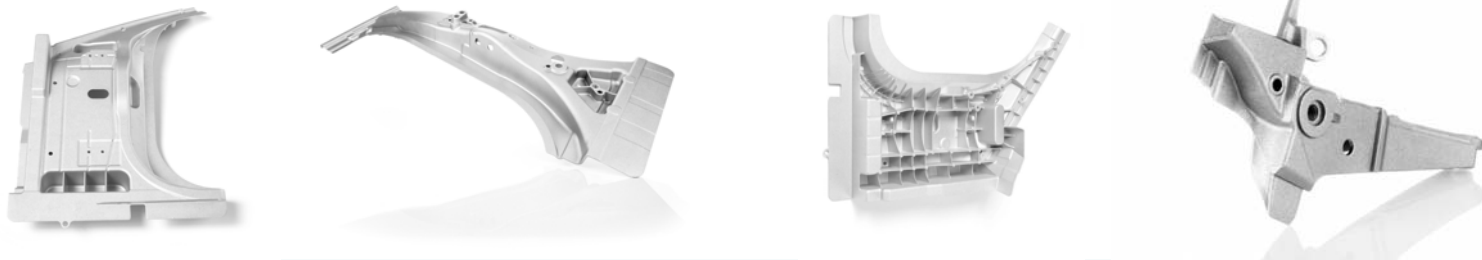
- Benefits of Retrofit
- Throttling Manifold Integration
 - Toro Company A Case History
- Benefits of the Sure-Trak2 Shot Control System
- Other Throttling Manifolds
- Summary
- Q&A



Why Retrofit?

Performance Benefits

- **Increased Performance:**
Gain 100"/sec. from your shotend.
- **Increased Efficiency:**
Over 15% jump in overall machine cell output.
- **Decreased Scrap:**
25% less scrap means more margin.
- **Lower Impact:**
Reduce flash, reduce tool wear, reduce wear & tear on DCM

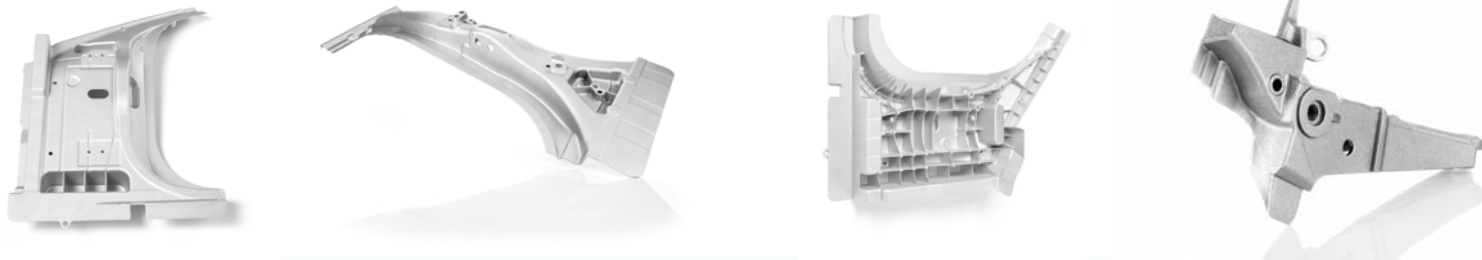


Why Retrofit?

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Business Benefits

- **Extend the Life of Your Existing shotend:**
New capabilities for a fraction of the cost of buying new.
- **New Products, New Markets:**
Any shape shot profile, any injection process.
- **Easy Upgrade:**
Minimized downtime and expert in-the-field installation.



CASE STUDY

THE TORO COMPANY

The Plant

- Neat & clean facility
- Over 20 years in operation
- Continuous change and improvement with an eye to the future



The Team - Fabrication Group

- Project Engineer
- Tooling Engineer
- Injection Molding Process Engineer
- Production Scheduler
- Shift Supervisors (3)
- Department Head

The Equipment

- Injection Molding Machines (7)
- Die-casting Machines (5)
- Automated cells
- Largest Machine: 1,600-ton Prince



Prince 1600-ton with Binary II shot valve

The Production Environment

- Available production on machine typically sold out from October-June (summer season production)
- A dozen different lawn mower decks are run
- Post-cast trim, clean, and painting on site.
- **Lean staff + High volumes = Highly Automated**

Robust, Repeatability, and Low Scrap Rates

The Challenge

- Mower deck designs have increased in size
- New designs require a process that approaches the clamp tonnage of the upper half.
- Decks are center shot so limited area is available for the ingate.
- Long metal travel distance requires consistent shot performance.

The Shotend - Before

- 1600-ton Binary II three-speed shot system.
- Upgraded with ramping capability for the slow and intermediate velocities.
- No low impact system.



Binary II shot valve

Recurring maintenance issues

- **Binary II shot valve developed leakage issue**
 - Occasional cracked segment on the valve – changed the velocity profile and caused scrap.
- **Binary II shot valve segments not collapsing properly**
 - Caused inconsistent shot speeds in fast shot
 - Caused scrap castings from where poor fill resulted from increasing fill times.
 - Operators frequently adjusting the shot control settings trying to maintain filling velocity.
 - **Variation caused scrap rate climb and need to make a change!**

Changing Needs

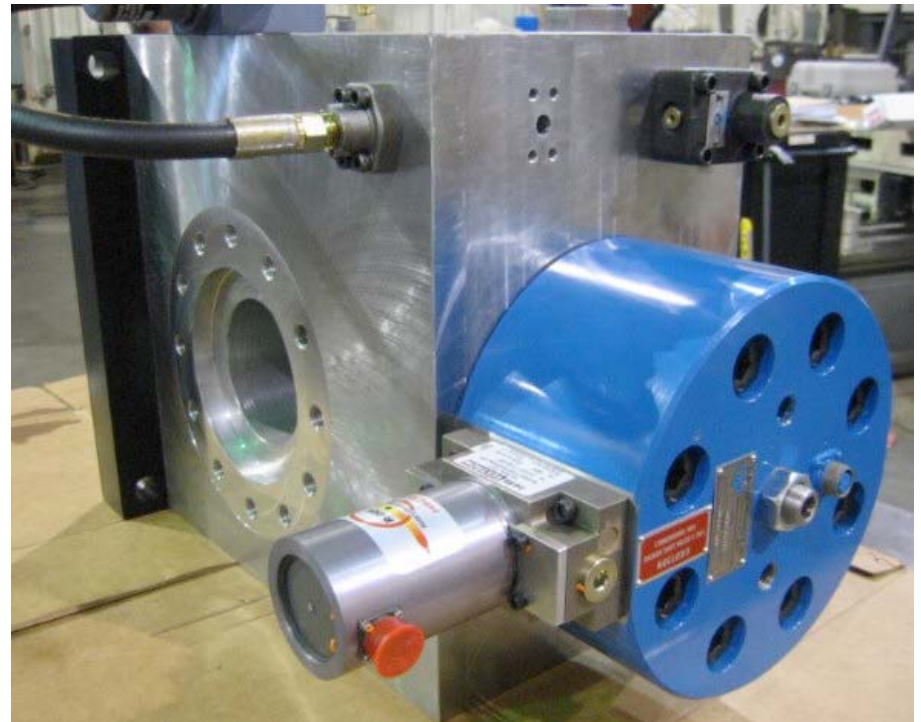
- More speed required to accommodate castings that were now challenging the original performance specifications
- Various alternative shotend options considered
- Buying a new shotend taken off the table – the current shotend was well designed and mechanically solid.

DECISION:

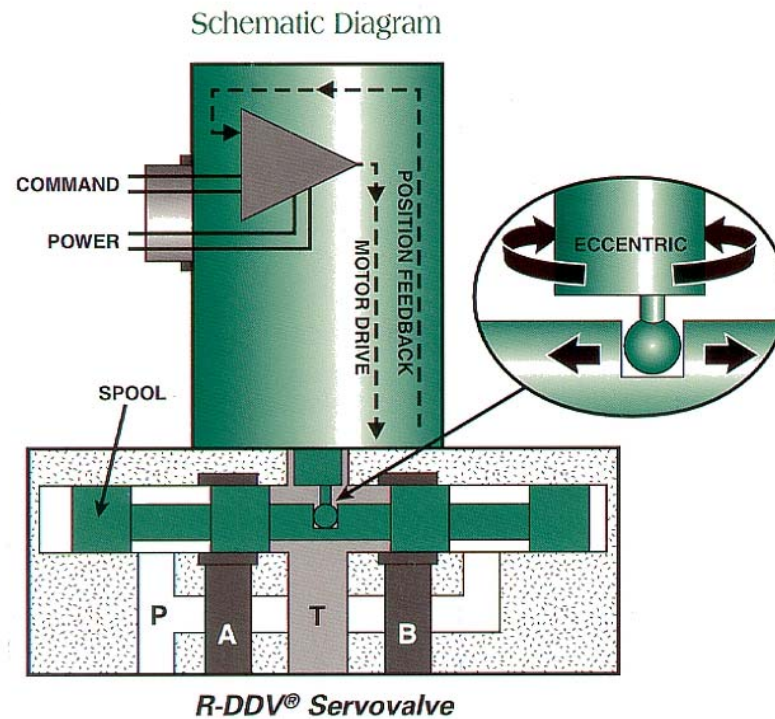
**A robust velocity control system
and more speed were required.**

Solution

- Remove Binary II shot valve and manifold block
- Direct bolt-in replacement with:
 - Olmsted 80mm two-way, servo-piloted throttling valve slip-in cartridge format
 - Piloted by an H.R. Textron R-DDV servo pilot valve
 - PO check valve releases oil to retract the shot cylinder
 - Cartridge valve develops pressure to retract the shot cylinder
 - Cartridge filter ensures a clean oil supply



HR Textron R-DDV Direct Drive



Has been successfully proven over many years in the rugged die casting environment

Installation

Start: Tuesday Morning Delivery

Finish: Thursday Afternoon

- Manifold bolted-in
- Original connections replaced with new fittings
- 3" high pressure pipe moved 3" to accommodate new block
- Rotary rack and pinion encoder replaced by a Visi-Trak Sensor in 1" tail rod.

Total install < 3 days

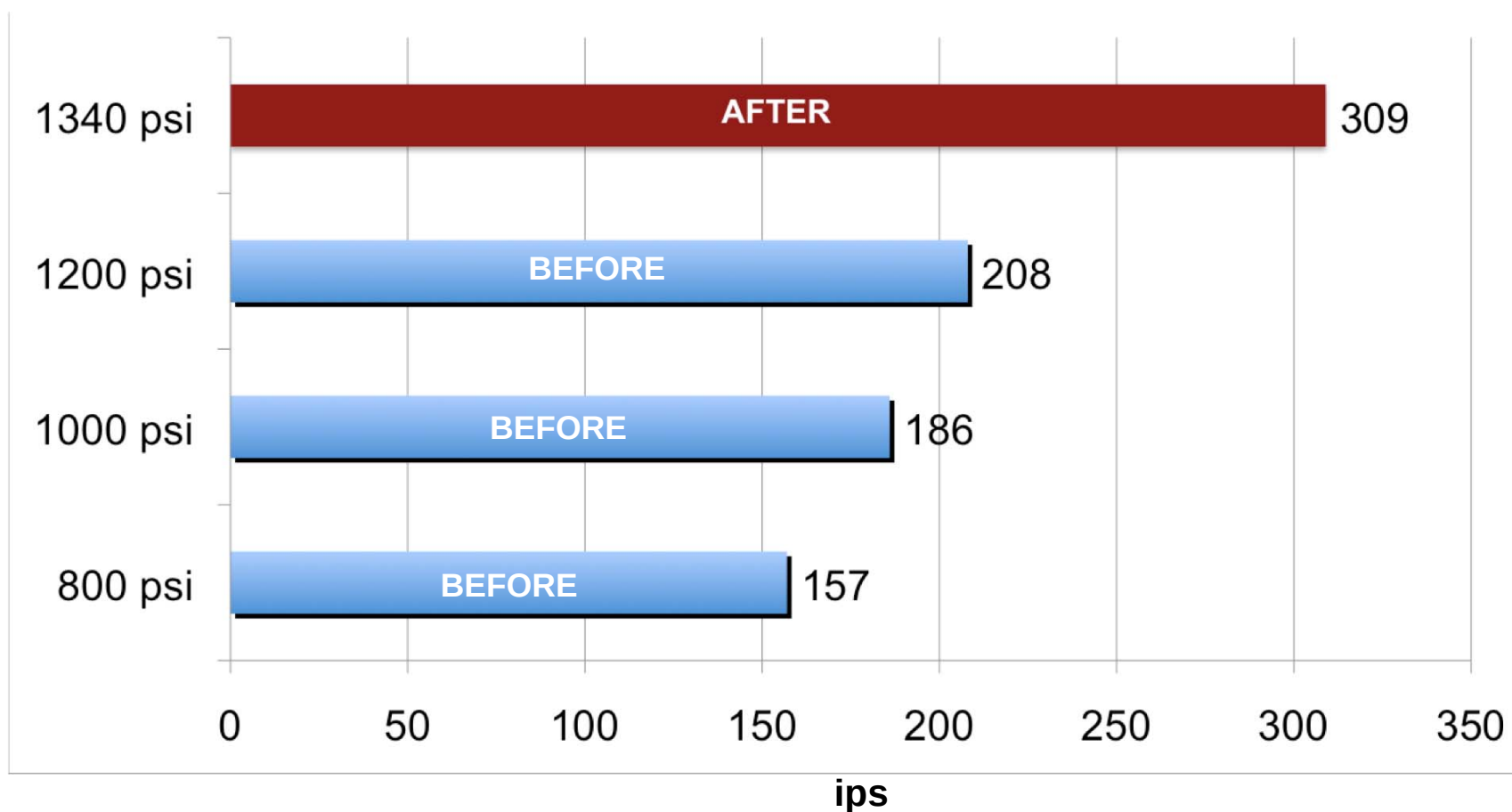


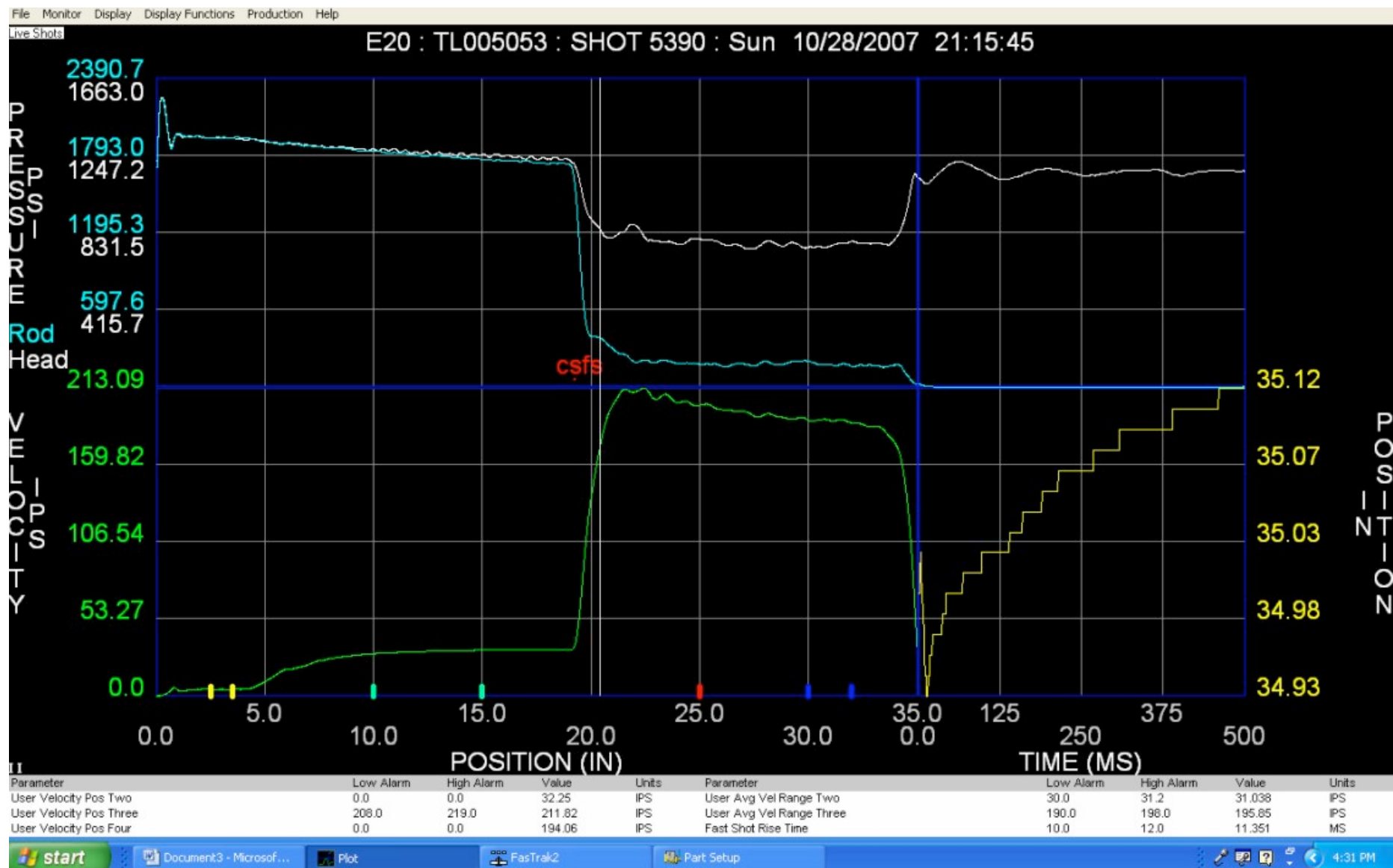
"The new Visi-Trak valve **increased our top speed by over 100" per second** and has made it possible to continue creating cost-effective castings even after we outgrew the original capability of the machine."

DAVE BROCKMAN

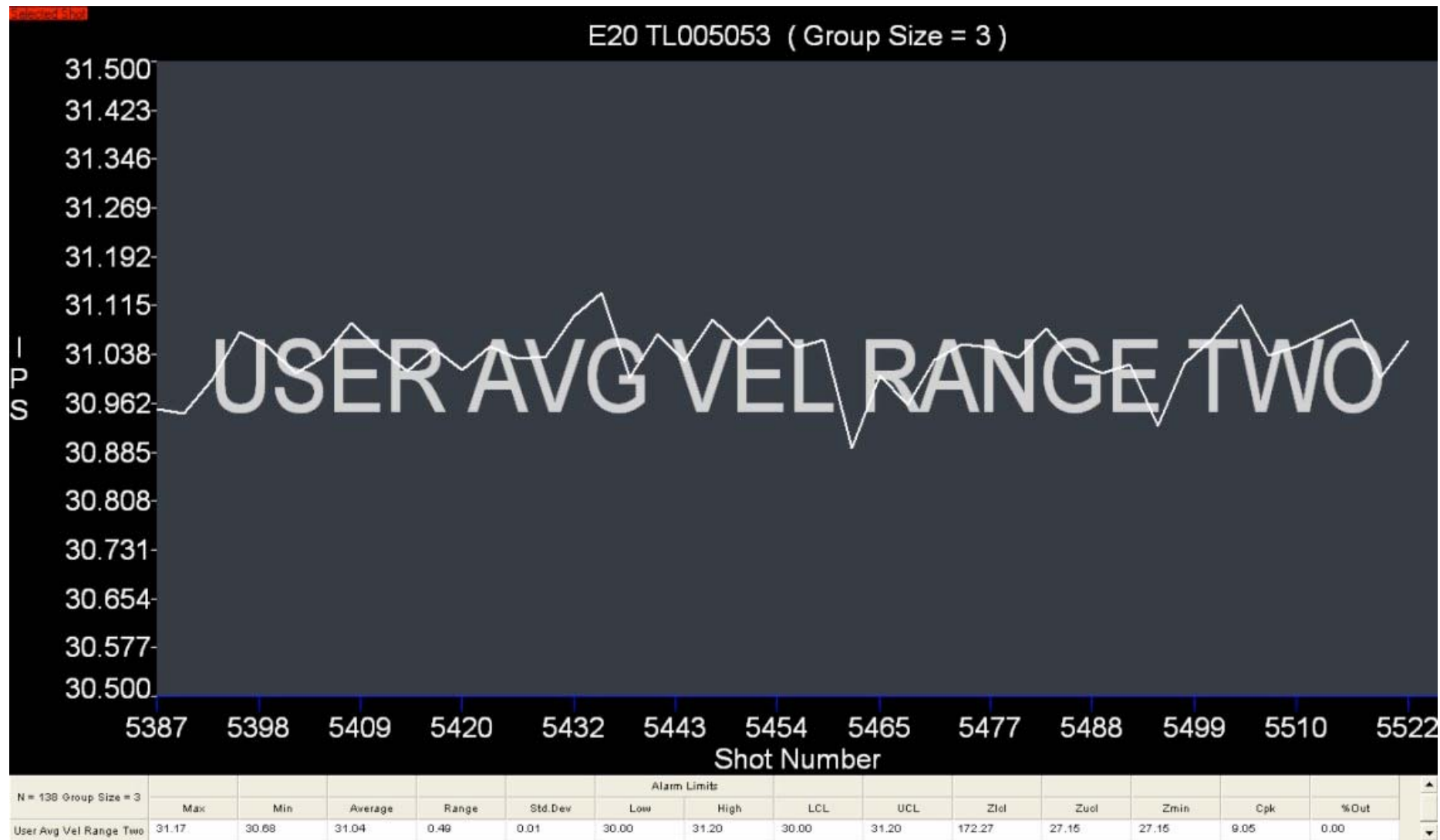
Senior Fabrication Project Engineer
The Toro Company, Windom, MN

Performance Results





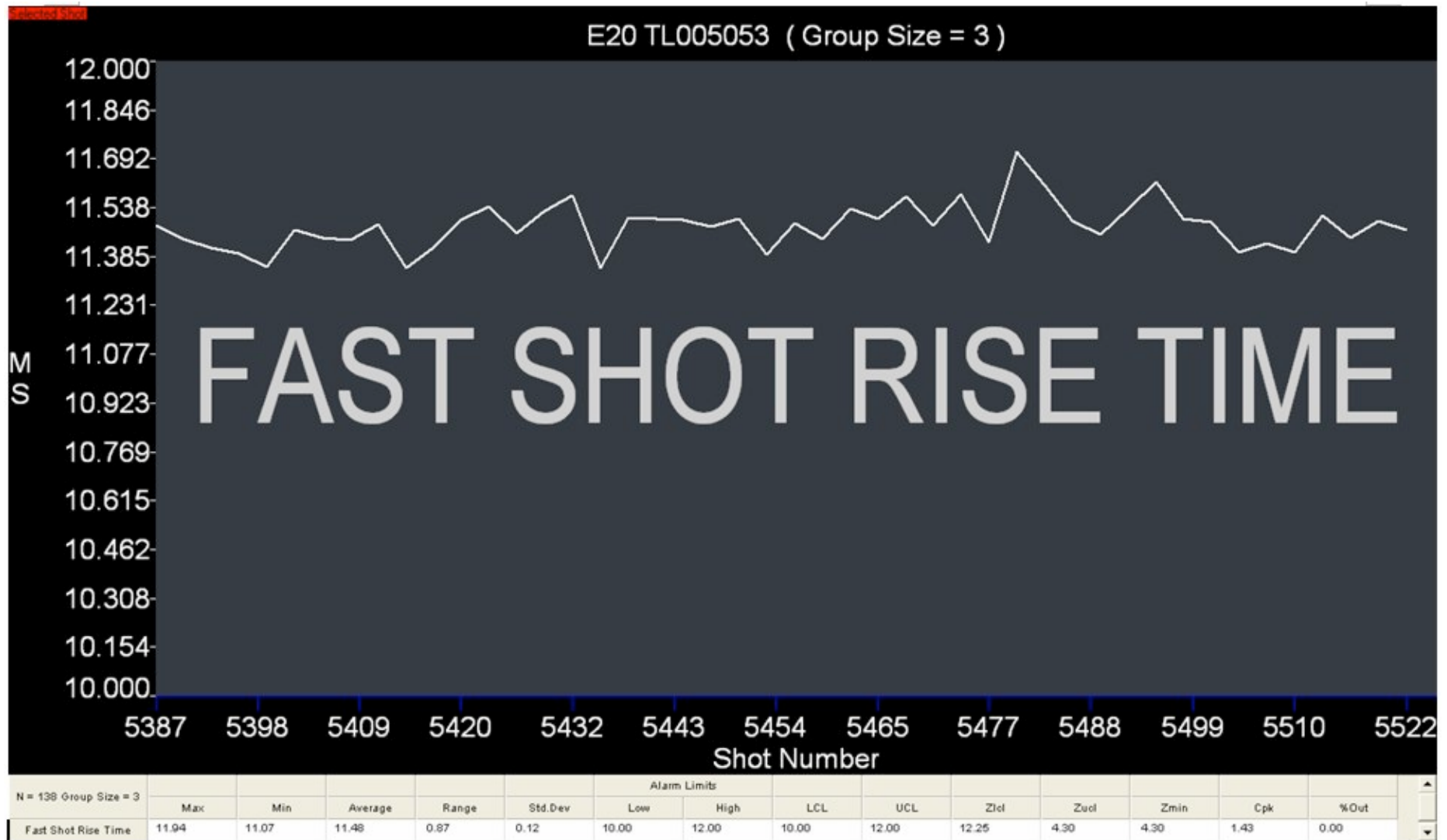
Shot Profile – New Throttling Manifold



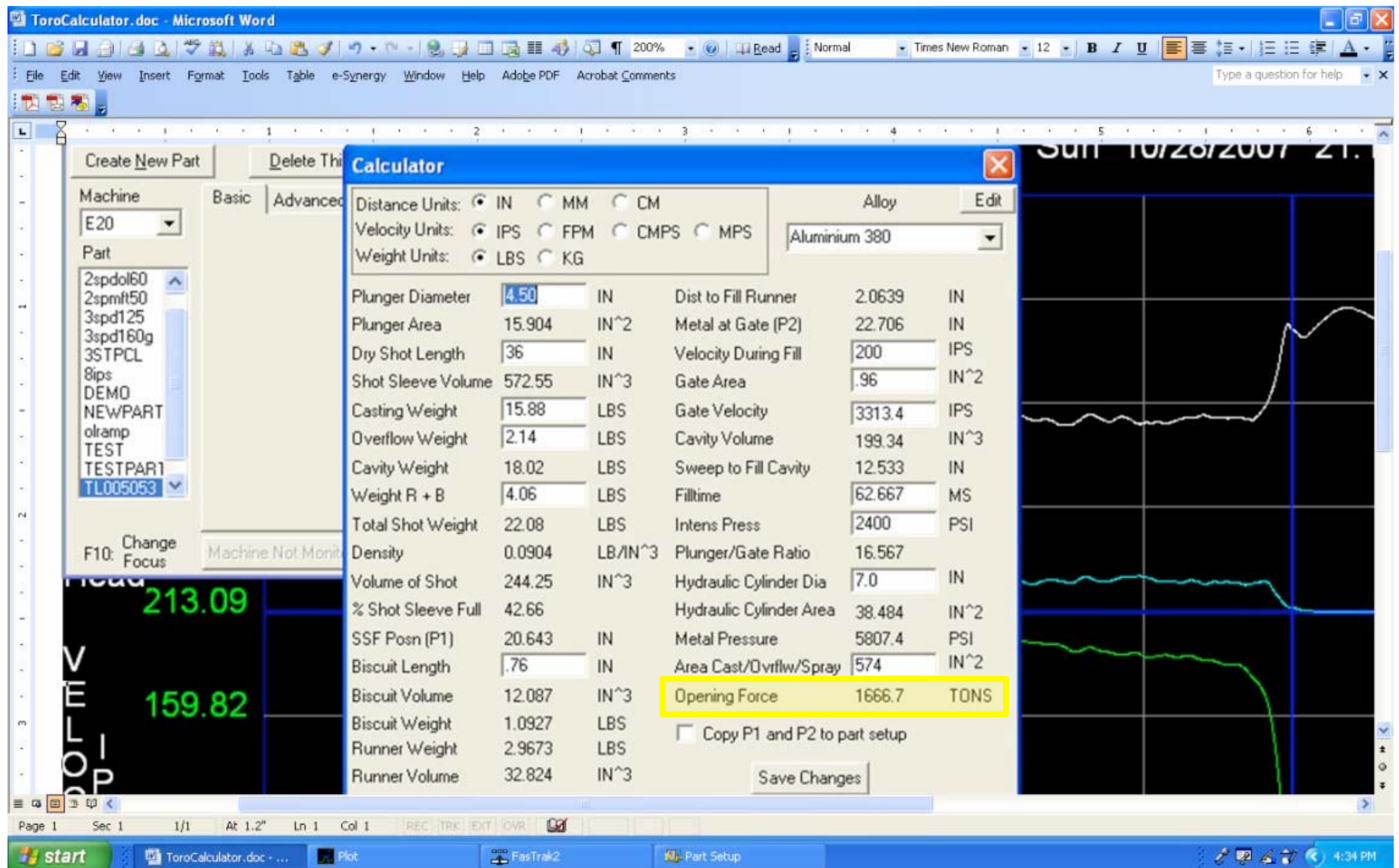
X-Bar Chart – Avg. velocity from 10-15" stroke



X-Bar Chart – Repeatability from 25-30" of stroke



X-Bar - Fast Shot Rise Time



Calculator – 1667 tons of clamp pressure required

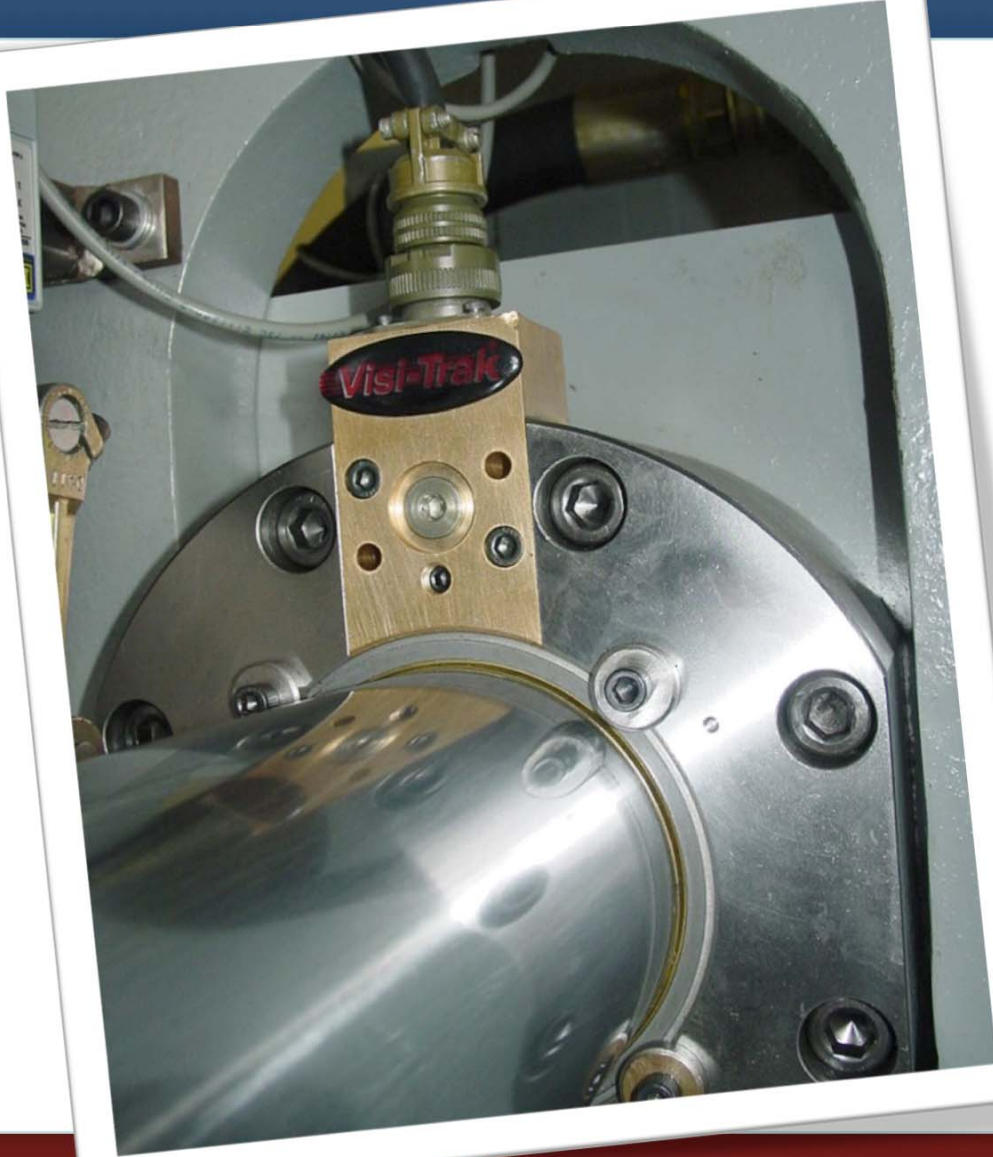
Internal Audit Results

- **Challenging castings now easily accomplished**
- **Outstanding velocity control** capability throughout the shot
- Overall equipment **efficiency increased by 15.5%**
- **Scrap rate reduced by 28.5%**
- **Significant flash reduction** using low impact capability
- **Total integration cost: ~40% of new a shotend.**

“The retrofit package and the Sure-Trak2 Control from Visi-Trak[®], has given us a shot system with **outstanding control & performance**. This economical solution extended the service life of the machine and helps us continue to make cost-effective castings after they have outgrown the clamp tonnage capacity of the machine. **Its a lot of bang for the buck.**”

DAVE BROCKMAN

Senior Fabrication Project Engineer
The Toro Company, Windom, MN



TOUGH + RELIABLE

Design Simplicity
for inherent reliability.

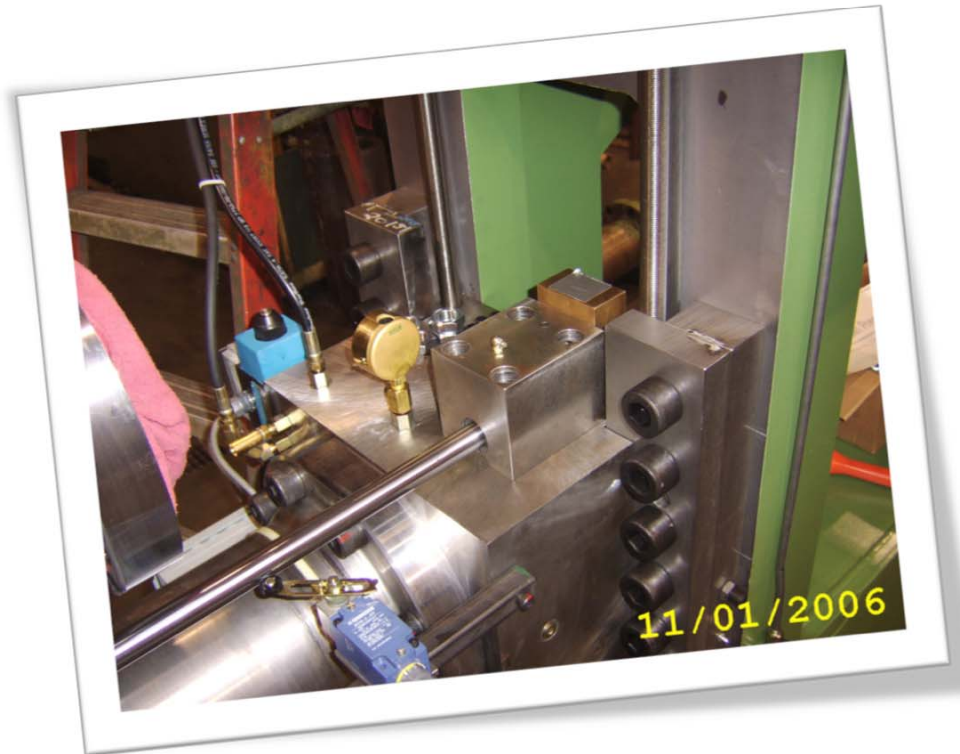
Extreme Accuracy
up to 480IPS/12MPS.

Non-contact sensor
minimizes equipment wear.

No calibration or alignment
means no set-up problems.

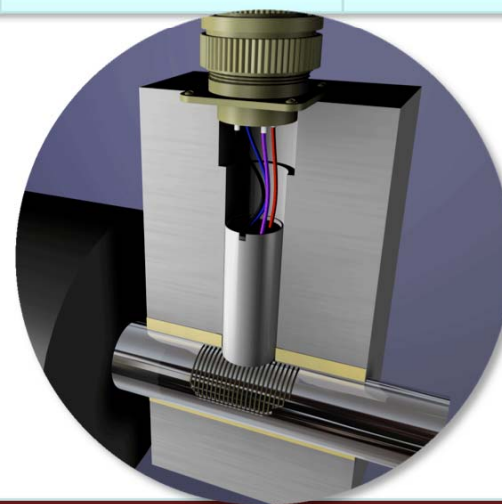
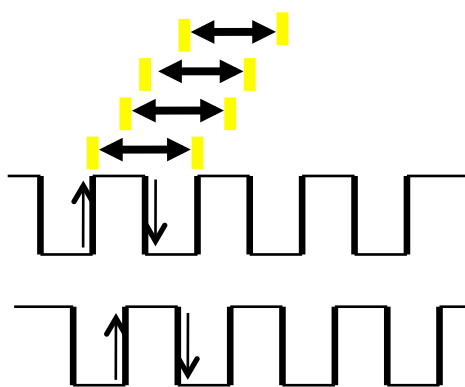
Proven Performance
for over 25 years.

Easy to install & operate
nearly maintenance free.



Time, Position, Intensification Data Resolutions

	Displacement	Time (milliseconds)	Time Based Samples (3ms)	Position Based Samples
Slow Shot (Fill)	13.00"	949	316	1040
Fast Shot	6.64"	55	18	532
Intensification	.06"	500	167	500
Total	19.70"	1504	501	2072



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Sure-Trak2[™]

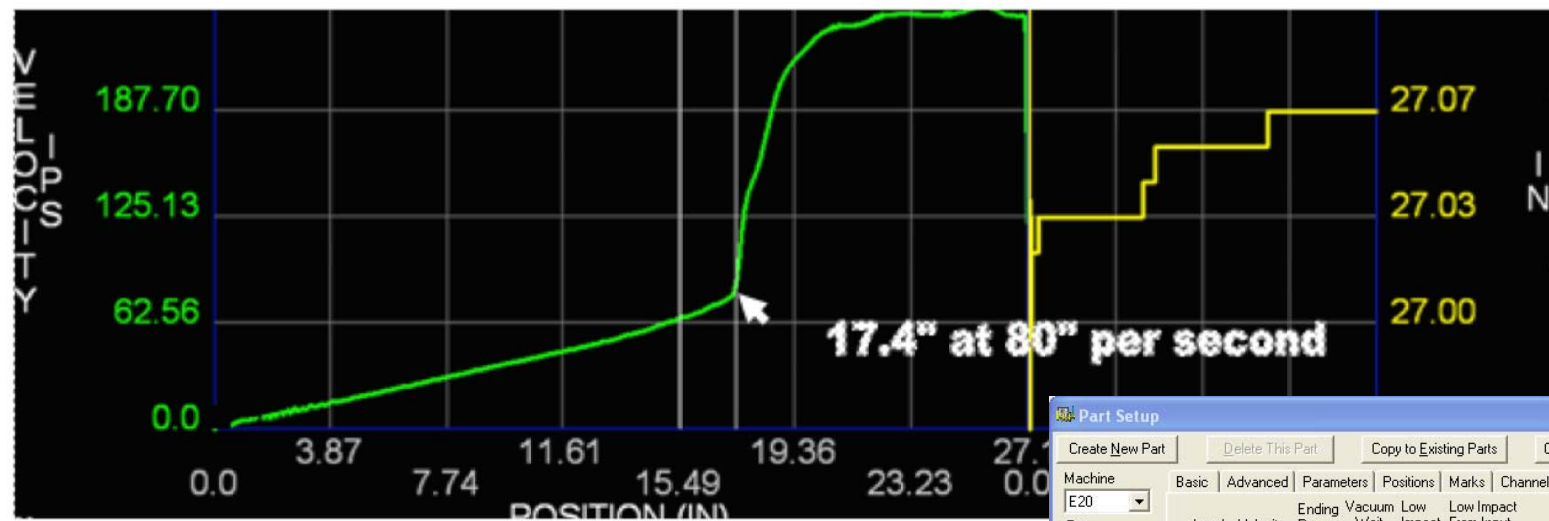
DIE CASTING SHOT CONTROL SYSTEM

Sure-Trak2[™] Control Benefits:

- **Reduce Air Entrapment** during Slow Phase
- **Smooth Metal Flow &** Flexibility of adjustments during Fast Shot/ Fill Phase
- **Repeatability** regardless of changes
- **Deceleration** for Low Impact
- **Programmability** in engineering units for fast and repeatable Set-ups
- **Store, Recall and Download** Set-ups
- **Easily Retrofitted** to Existing Machines or Specify on New Machines

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The screenshot shows the 'Part Setup' dialog box for a machine. The 'Machine' is set to 'E20'. The 'Part' is '150cl', with '250IPS' selected. The 'Part' description is 'NEWPART ramp VISITRAK'. The 'MS-DOS' checkbox is checked. The 'Change Focus' button is highlighted.

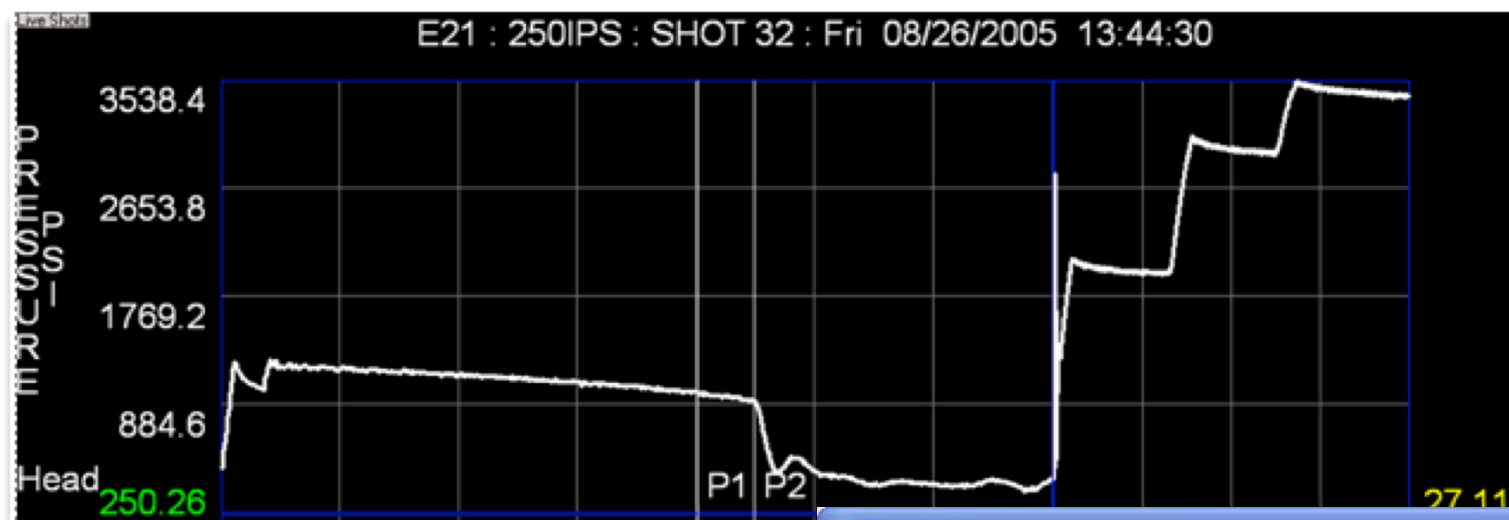
The 'Part Setup' dialog box includes the following sections:

- Buttons:** Create New Part, Delete This Part, Copy to Existing Parts, Copy to Other Machines, Calculator.
- Tabs:** Basic, Advanced, Parameters, Positions, Marks, Channels, Shot Control, Pressure Control, Setup.
- Machine:** E20 (dropdown).
- Part:** 150cl, 250IPS (selected), 6step, 81205, NEWPART, ramp, VISITRAK.
- Parameters:**
 - Accel: 16, 250, 3, 4, 5, 6.
 - Velocity: 80, 25.5, 17, 5%.
 - Ending Pos.: 17, 25.5, 17, 5%.
 - Vacuum Wait: 17, 25.5, 17, 5%.
 - Low Impact: 17, 25.5, 17, 5%.
 - Low Impact From Input: 17, 25.5, 17, 5%.
- Limit Switch Positions:**
 - POUR HOLE COVER: 22, 29.
 - CLOSE VACUUM: 30, 31.
 - CHECK VACUUM: 31, 32.
 - INTENSIFICATION: 32, 33.
- Wire:** 375.0, 300.0, 300.0, 300.0.
- Break Settings:**
 - Velocity: 300.0, 300.0, 300.0.
 - Gain: 1.0, 1.0, 1.0.
- FollowThru Stop Pos:** 100.0.
- Warmup Shot:**
 - Enable: ☐.
 - if Wire: ☐.
 - is: ☐.
 - Off: ☐.
- Buttons:** MS-DOS, Change Focus, This is the Current Part, Save Changes, Reload Saved Setup, Print.

The graph below the dialog box shows Velocity (Y-axis, 0.0 to 250.0) versus Position IN (X-axis, 0.00 to 30.00). The graph displays a ramp profile where the velocity increases linearly from 0.0 at Position 0.00 to approximately 75.0 at Position 17.00. The velocity then remains constant at 75.0 until Position 25.00, where it drops sharply to 0.0 and remains constant until Position 30.00.

Programmable Pressure

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Part Setup

Create New Part Delete This Part Copy to Existing Parts Copy to Other Machines Calculator

Machine: E20

Part: 150cl, 250IPS, 6step, 81205, NEWPART, ramp, VISITRAK

Basic Advanced Parameters Positions Marks Channels Shot Control Pressure Control Setup

Pressure Control Profile Setup

☐ Enable Pressure Control
☐ Positive Commands Only

Pressure Sensor: Pres. 0-5v = 0-10000 PSI

Output Voltage Range: ☐ +2.5 V ☒ +5 V ☐ +10 V

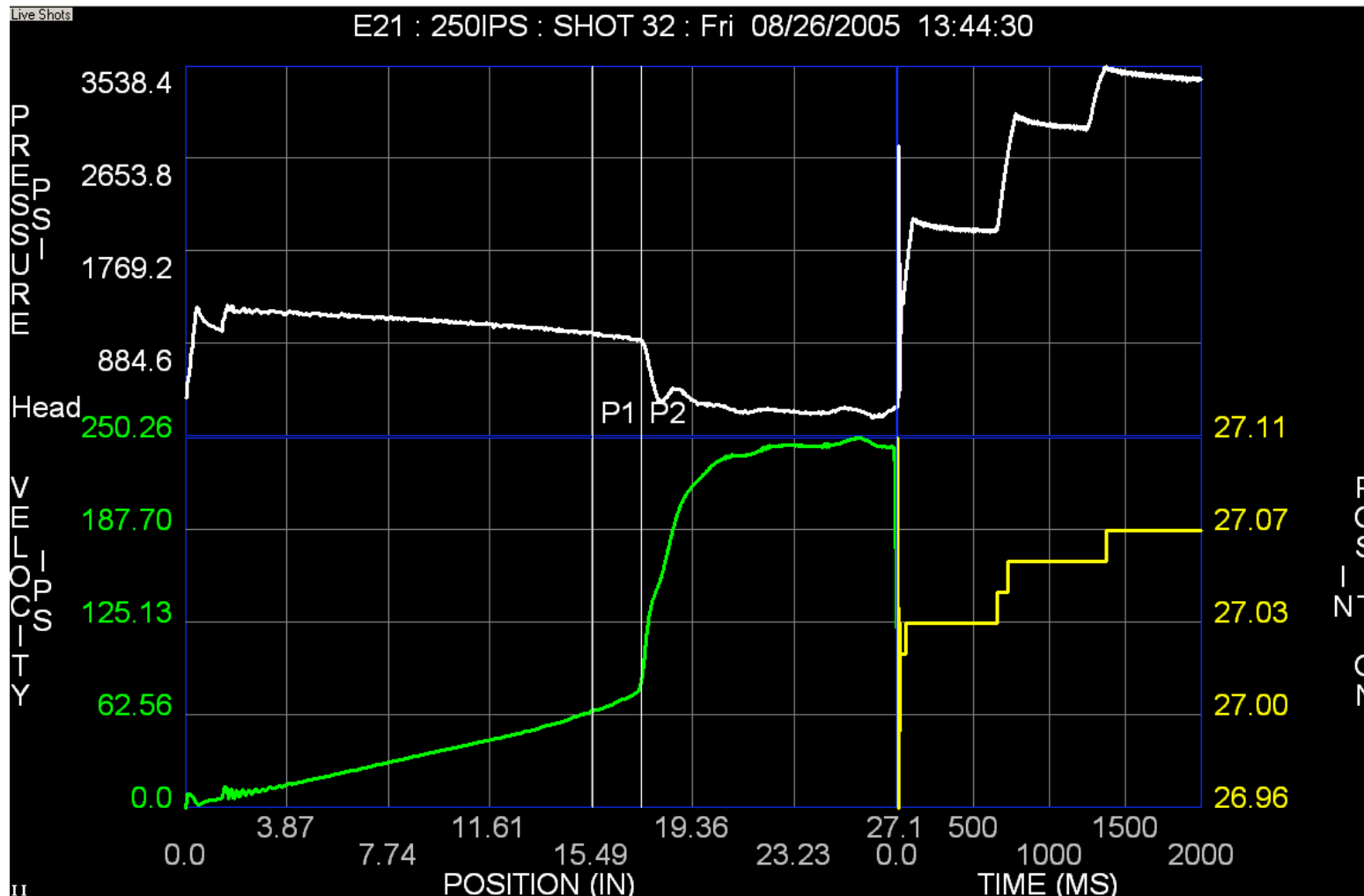
	Ramp	Pressure	Open Loop	Hold Time
1	3500 PSI	2000	☐	600 MS
2	5500 PSI	3000	☐	600 MS
3	6000 PSI	3500	☐	700 MS

Pressure Loop Gain:
Arm Volts:
Initial Pressure:
Retract Volts: 0
Valve Park Volts: 0

F10: Change Focus This is the Current Part Save Changes Reload Saved Setup Print

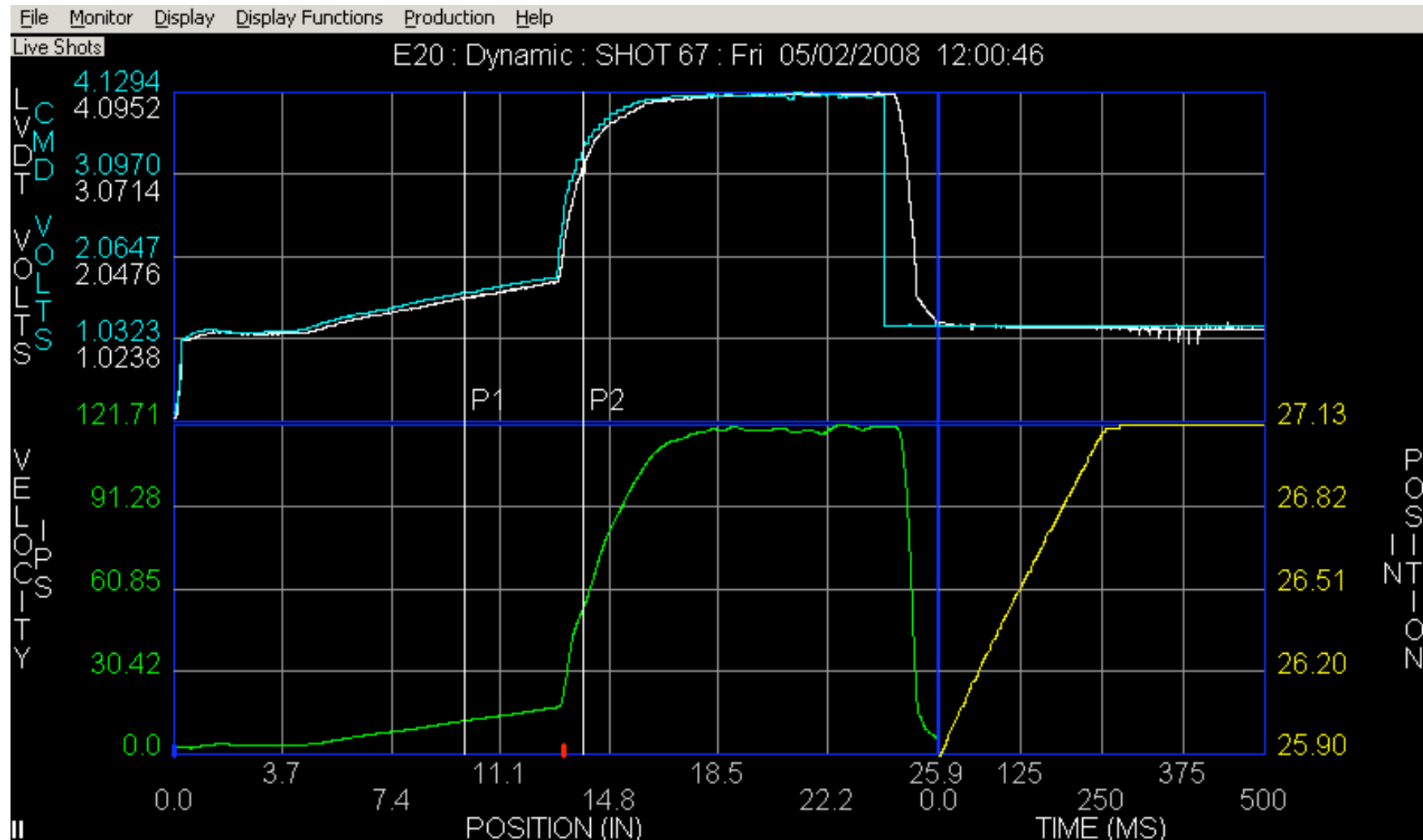
Programmable Pressure & Velocity Control

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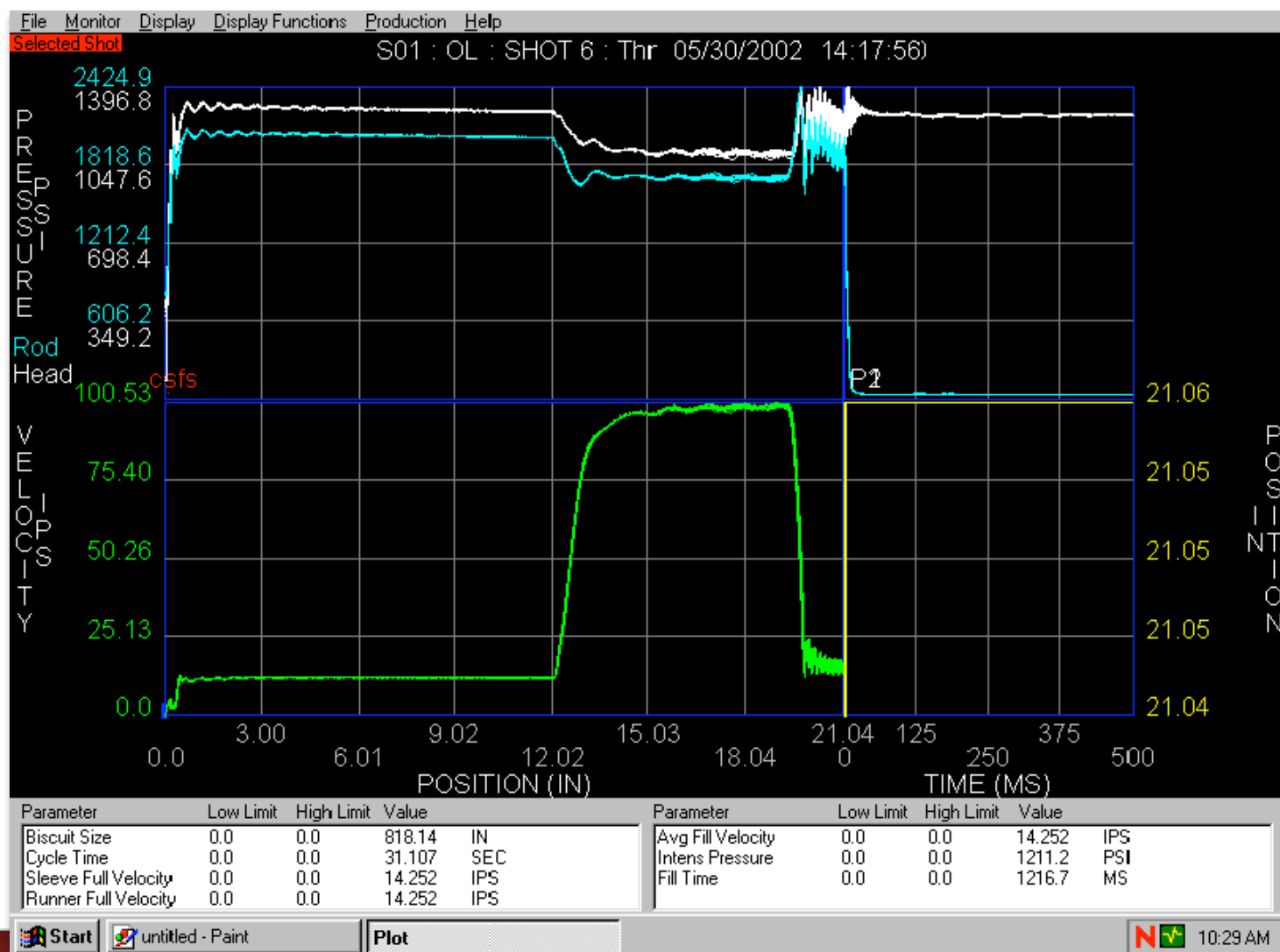
Dynamically Adjustable

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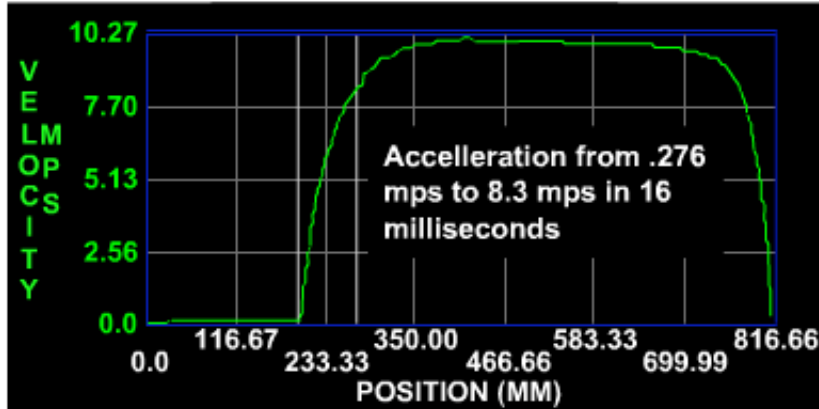
Repeatable (10 Shot Overlay)

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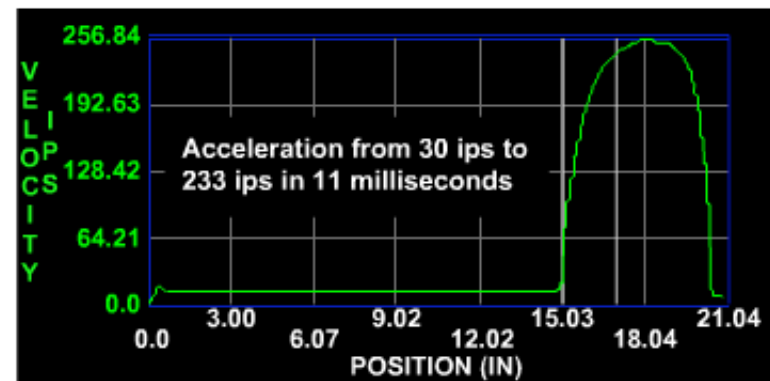
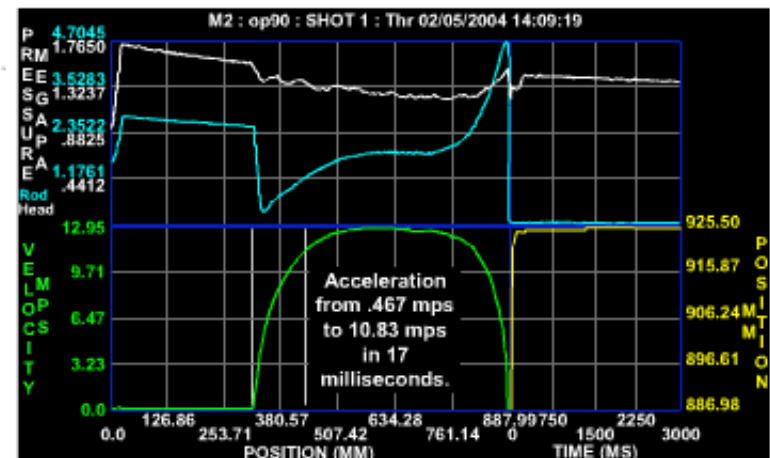


Responsive

If your die casting requirements demand extremely fast acceleration to fast shot with quick cavity fill... Sure-Trak[™] can deliver.



This shot from a 2500 ton Idra equipped with 100mm. SV Series Valve, and Sure-Trak[™] Control provides acceleration from .276 mps to 8.3 mps. in 16 milliseconds(10.9 inches per second to 326.8 ips.)



OTHER INTEGRATION DESIGNS

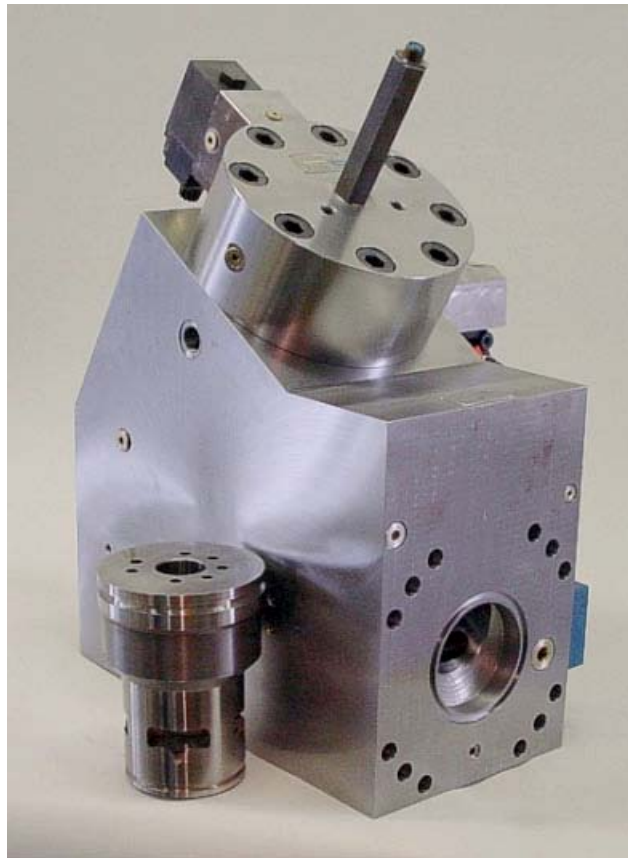
HPM New front head throttling manifold



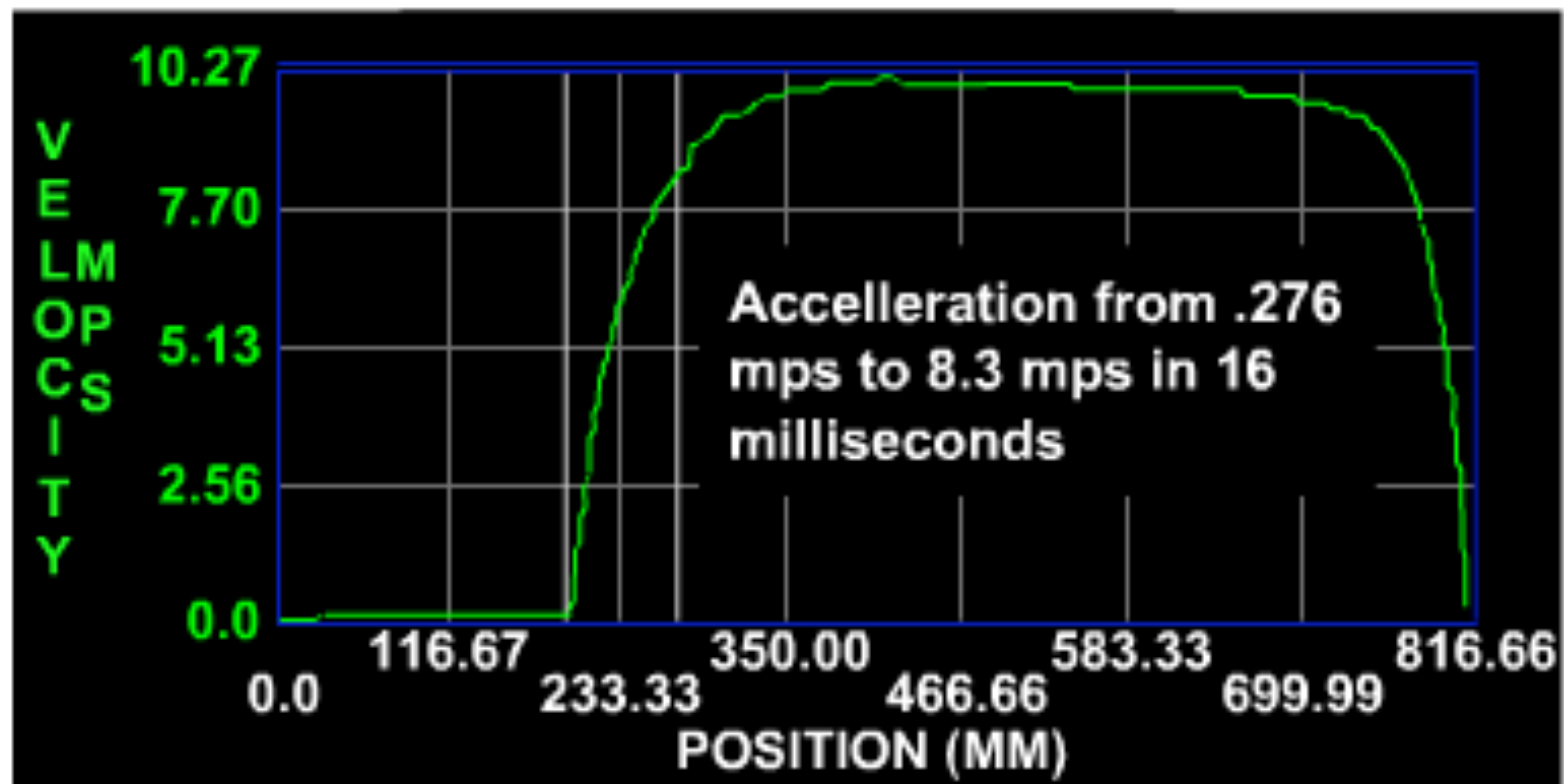
Advantages of New Front Head Design

- Eliminates the POC – a proprietary design from yesteryear
- Integrates Olmsted 2-way slip-in cartridge valve
- Extremely robust
- Outstanding shot control
- Reinforced packing retainer gland
- Improved rod end bearing surfaces ensure cylinder rigidity
- Visi-Trak sensor on piston rod is extremely robust

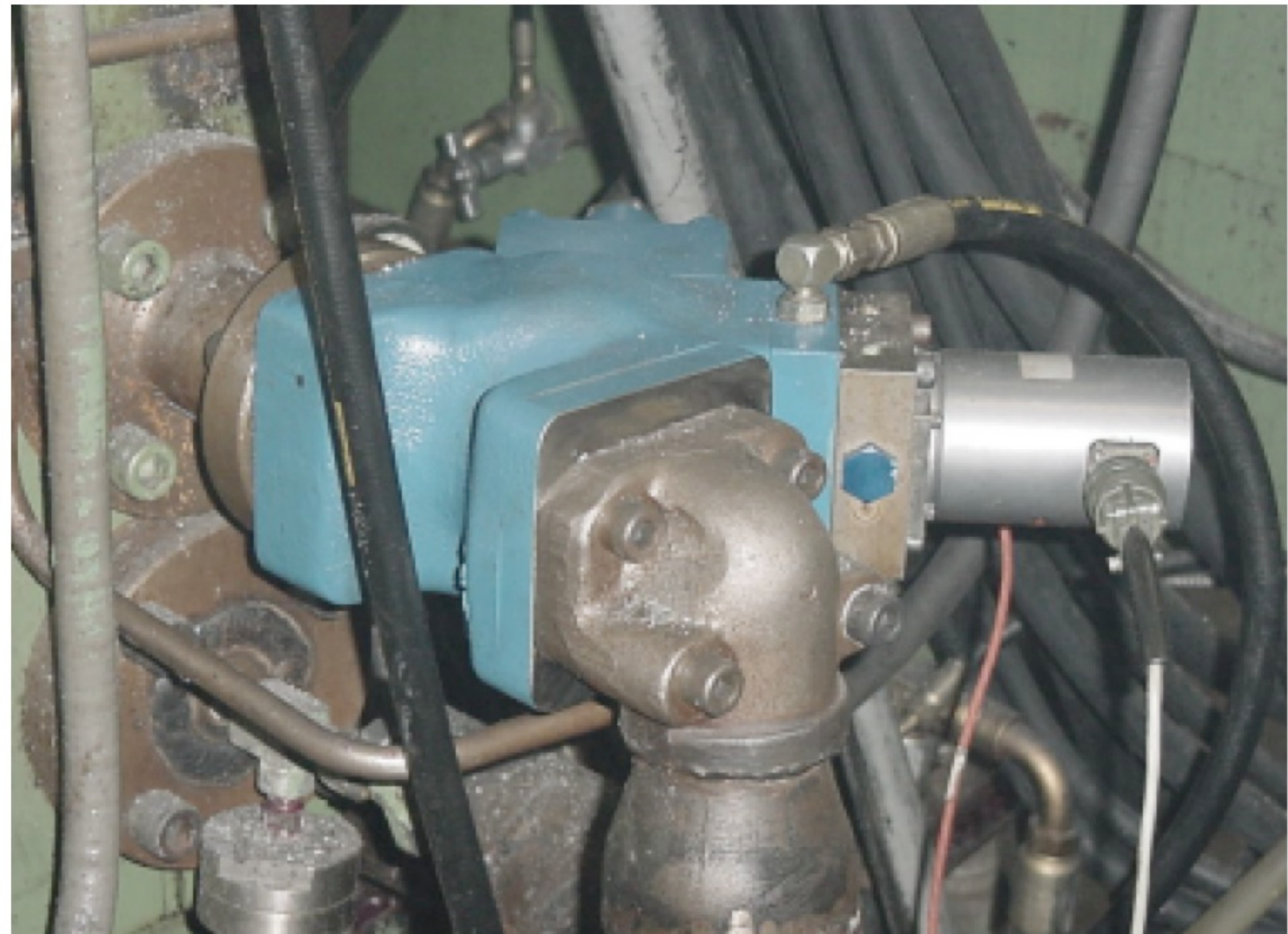
IDRA Throttling Manifold



IDRA Shot Profiles



Inline Valve Facilitates Hydraulic Integration on Some Shotend Hardware



Inline valve on Wolniak Shotend

Die Cast Press shotend connected to the casting for integration onto Ube DCM.





Die Cast Press shotend
with integrated Sure-Trak2
controls.

Hydraulic Throttling Integrations Engineered for:

- Toshiba
- Kux
- Triullzi
- Agrati
- B&T
- Weingarten
- Buhler “B” series machines – meter-in design
- And more...

Summary

- Enhanced Shot System Capabilities.
- Field Retrofitable.
- Flexible control system to run even the most challenging injection profiles.
- 100"/+sec increase in top shot speed.
- Less than half the cost of a new shotend.

Q&A

Thank You

Jack Branden
Vice President of Sales

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