

Applying Human Factors To Quality & Other Business KPI's

SCOT FORGE

SafeStart Conference - November 2019



Background – Who We Are

Employee Owned Open Die Forge Shop

Largest Open Die Forging Company in
North America

126 Years Old (Employee Owned for 41
Years)

550 Employees in 3 Locations

Background – Who We Are

Our Environment:

- Forgings at 2300°F
- Material Handling Objects Weighing Up To 120,000 Pounds
- Machining Large Parts – Rigging & Turnings
- Continually Expanding

Background – Who We Are





HUMAN FACTORS IS ALL ABOUT INFLUENCING & UNDERSTANDING WHY WE DO WHAT WE DO

**Organizational Level
Individual Level**

For A Business

A **mission statement** defines what an organization is, why it exists, its reason for being.

Scot Forge's mission statement was created to capture who we are as an organization, who we serve, and why we operate the way we do.

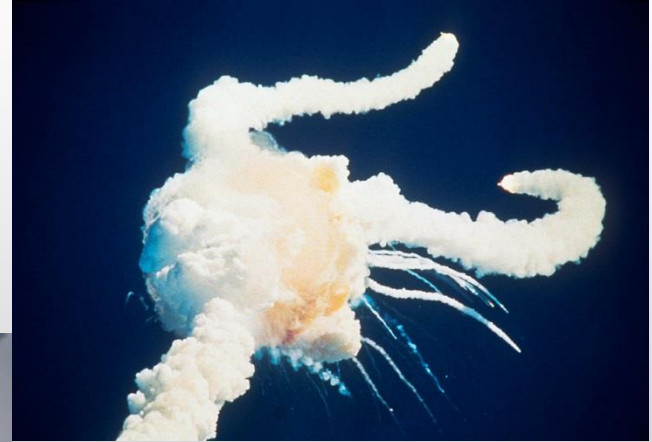
Scot Forge Mission Statement

Through the unwavering commitment of our employee owners, we will forge a better future for those we serve: our customers, fellow owners, suppliers and communities. The foundation of our commitment is our unique employee owned culture, which embodies the values of **safety, personal accountability, integrity, continuous improvement, learning and collaboration.**

Why Does Operating By These Values Matter To Us?

- 100's of small business we supply stake their reputation on our quality and technical support.
- Many of our forgings protect people from injury or death.
- Our forgings are critical to our national defense.
- \$100M's of projects and hardware are protected by our forging quality.

What Can Wrong Look Like?



Legal Issues

NASA subcontractor to pay \$46 million fine over aluminum NASA cited in rocket failures

By Rachel Weiner

April 23

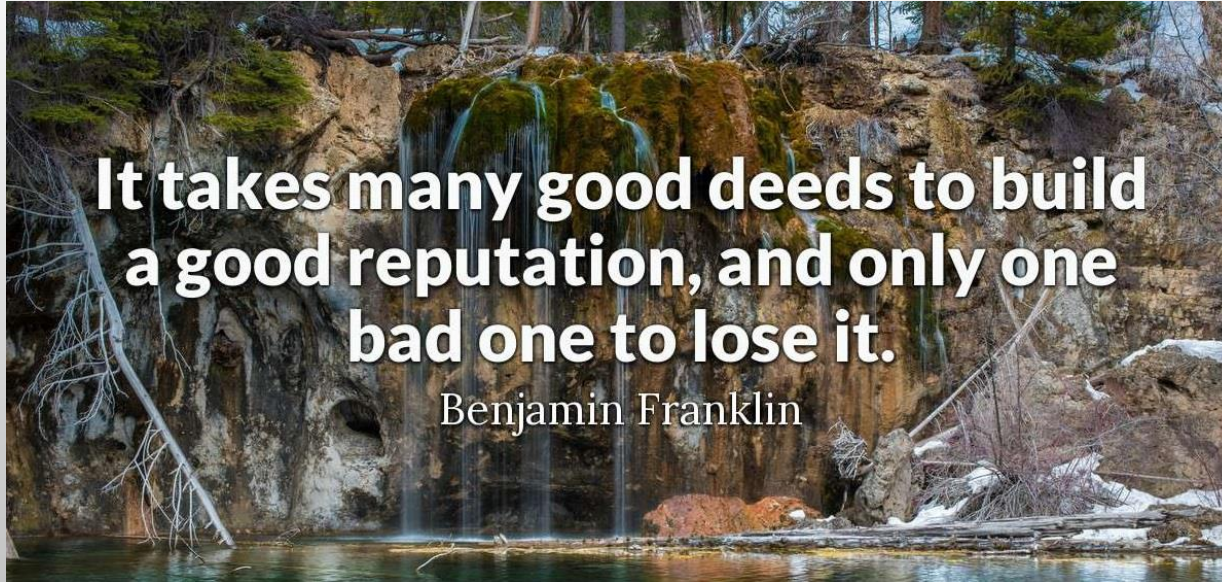
A NASA subcontractor will pay a \$46 million fine after admitting to falsifying test results in aluminum manufacturing for nearly two decades, the Justice Department said Tuesday.

The aluminum parts in question made their way into use in “frangible” joints that hold explosive charges in rockets used by NASA and missiles used by the Missile Defense Agency. NASA blames the aluminum parts for two failed rocket launches, something the company disputes and the Justice Department did not prove.

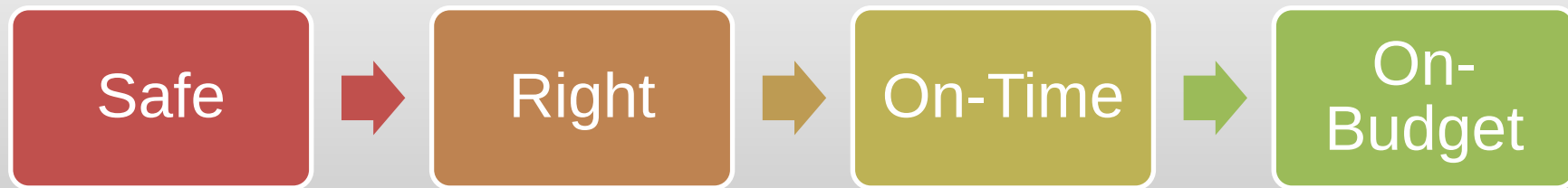
As part of the agreement, the Norway-based company has pleaded guilty to one count of mail fraud and the agency has agreed not to file any additional charges.

The company, formerly called Sapa Extrusions and now Hydro Extrusion, has been suspended from government contracting since September 2015.

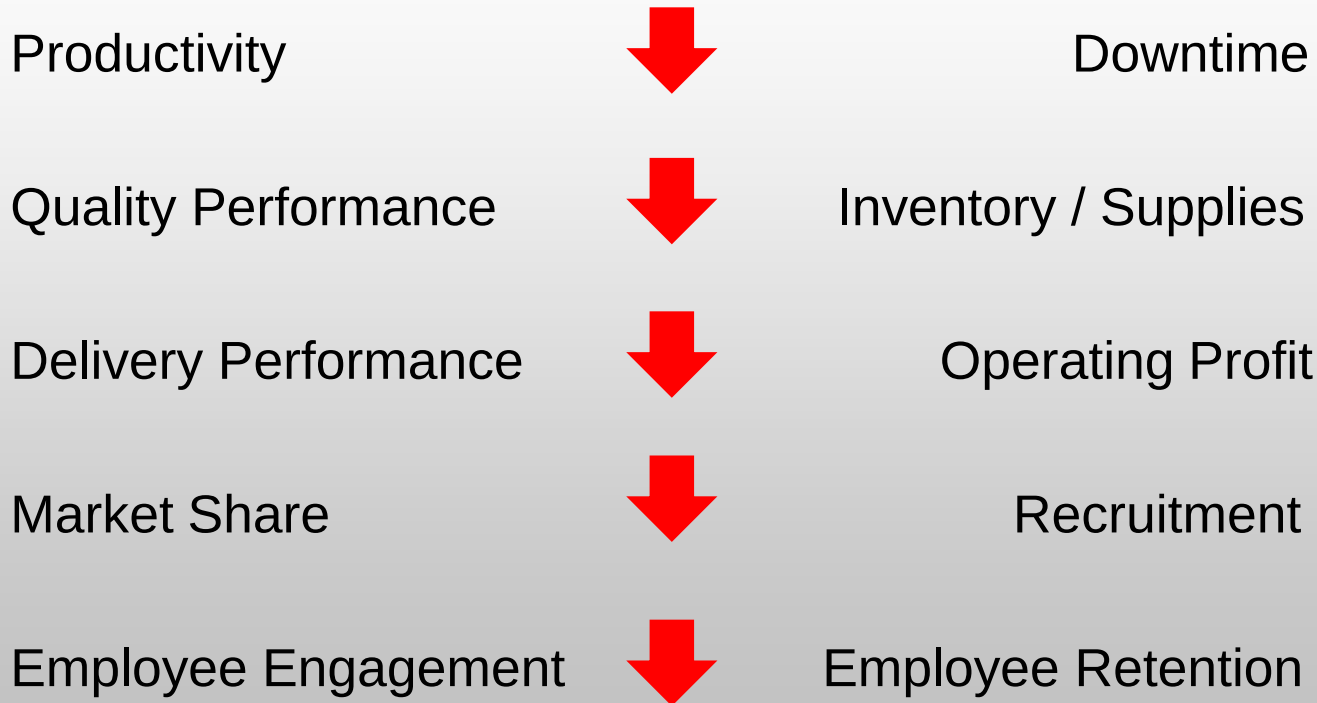
The future of our business is dependent on our behaviors today



Daily Success For Our Business



Business KPI's Affected By Poor Safety



THE PROBLEM WITH CHANGE:

NO ONE LIKES IT

Barriers To Change

We have to change our thinking

“We’ve done it that way forever...”

“That’s the way we do it around here...”

“We always do it that way...”

Two Key Lessons About Change

All progress is change, but not all change is progress – John Wooden

Change before you have to – Jack Welch

Willingness

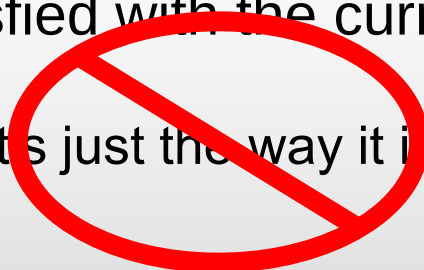
Altruistic / Moral - The current situation “just isn’t right”... it’s not in keeping with your values.

Forced – Attitudes are often changed by a tragic event such as a fatality or severe injury.

Proactive versus Reactive

Key Ingredients For Change

A willingness to be dissatisfied with the current circumstances


“That’s just the way it is...”

A vision of the future state

The ability to motivate change and create engagement

The ability to sustain change

Dissatisfaction

In 1997, Scot Forge sent ~1/3 of its shop employees to the hospital.

Old school mentality about safety within the industry.

OSHA sent Scot Forge a letter stating it wished to camp out on-site to “help us improve”. We had zip for compliance programs.

Thankfully, but reactively, Scot Forge decided it was time to get serious about safety.

Vision Of The Future

Where does your organization want to go
and do you truly believe you can get there?

Have you mapped out the course to that
destination?

In Our Case...

We had to get into compliance

We had to stop the injuries from happening

In Our Case...

We had to get into compliance

- Opted to partner with OSHA's on-site consultation program to get our programs where they needed to be

We had to stop the injuries from happening

- Opted to start an observation process
- Created the mentality we were all in this together

Stop The Injuries From Happening

In order to do that, you need to know why people are getting hurt.

We started asking ourselves a lot of “why” questions as part of our newly implemented observation process.

Why's Lead To Improvements

Why do we do that task that way?

Is there a safer way we can do that?

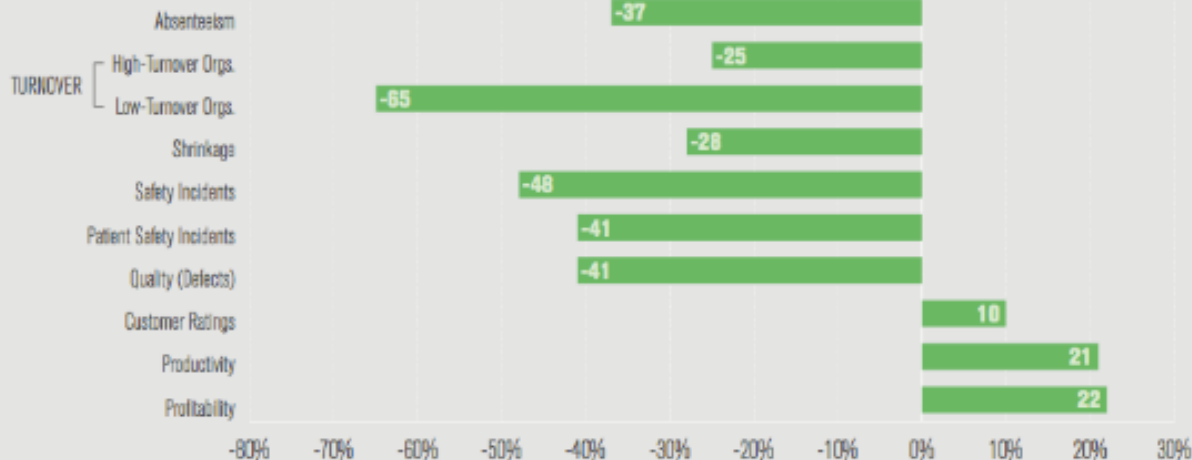
This approach drives towards pro-active safety and leads to engagement of the workforce.

According to Gallup Research, a company with an engaged workforce sees a 48% drop in safety incidents as well as improvements in many other KPI's.

What Are The Benefits Of Having An Engaged Workforce?

ENGAGEMENT'S EFFECT ON KEY PERFORMANCE INDICATORS

Median differences between top-quartile and bottom-quartile units were:



Source: Gallup

Human Factors Impact On Safety Performance

OSHA Compliance vs. Behavior Modification

OSHA Training Institute (2009-2016)

- Instructor for Safety & Health Management Class
- Always asked this question: “When you look at an injury log, what percentage of injuries are directly caused by unguarded physical hazards or lack of a required OSHA program?”
- Typical answer: “less than 10%” from compliance officers

Supporting Evidence

From *Industrial Safety & Hygiene News*, Oct 2013 Article: BBS Goes Global

Safety is about people: DuPont data suggests only 6 percent of all injuries occur because of hazardous or unsafe condition. Conversely 94 percent of all injuries are a result of unsafe actions, poor decisions and at-risk behaviors on the part of senior leaders, managers, supervisors and employees.

Our Thinking Began To Change

Everyone at our facilities leaves work each day and goes home to their family without an injury.

- It takes all of us working together to make that happen. *We are our brother's & sister's keeper.*
- Every day that is accomplished is a victory.
- If we can do it today, we should be able to do it each and every day.

To end the year with better safety processes, better training, and better performance than we have ever had in the past.

By 2004

Scot Forge's Spring Grove Plant became the first forging location to be SHARP certified in the United States.

All locations certified by early 2007.



But Wait A Minute...



- Scot Forge averaged 50 recordable injuries as a company in the years 2004-2007.
- OSHA was patting us on the back, giving us awards, and telling us we were elite.
- That did not make sense to us. Our team would not be satisfied until we were incident-free daily.

We Knew We Needed Something More

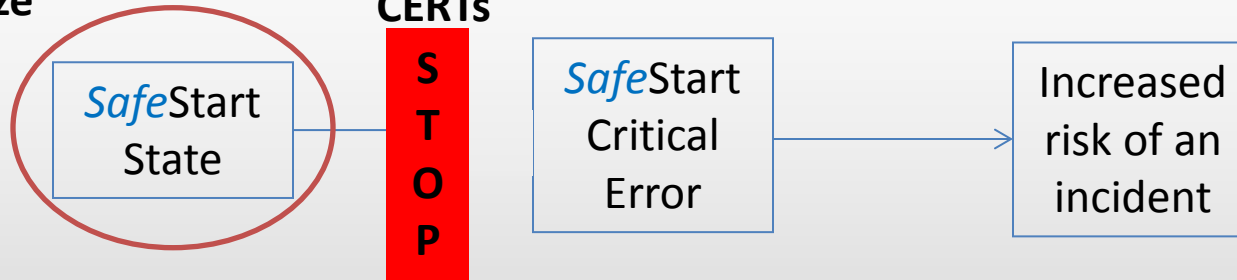
We researched a number of different tools to help us with this awareness and ultimately chose SafeStart:

- We determined over 80% of the injuries we were still experiencing followed their State to Error pattern.



CONCEPTS OVERVIEW

Recognize



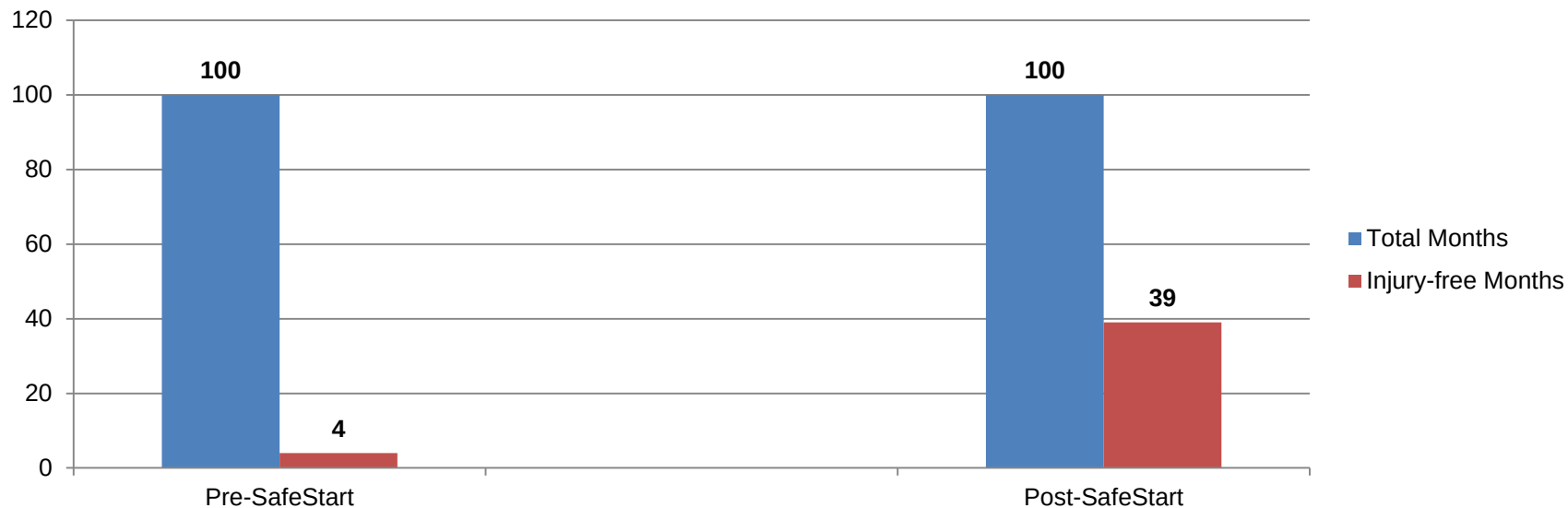
Being in one or more of the *SafeStart* states increases our chance of making a critical error that can lead to:

- Someone getting hurt;
- Damaging equipment; or
- Doing something that can harm our customer's part or our ability to meet our promised delivery date to them.

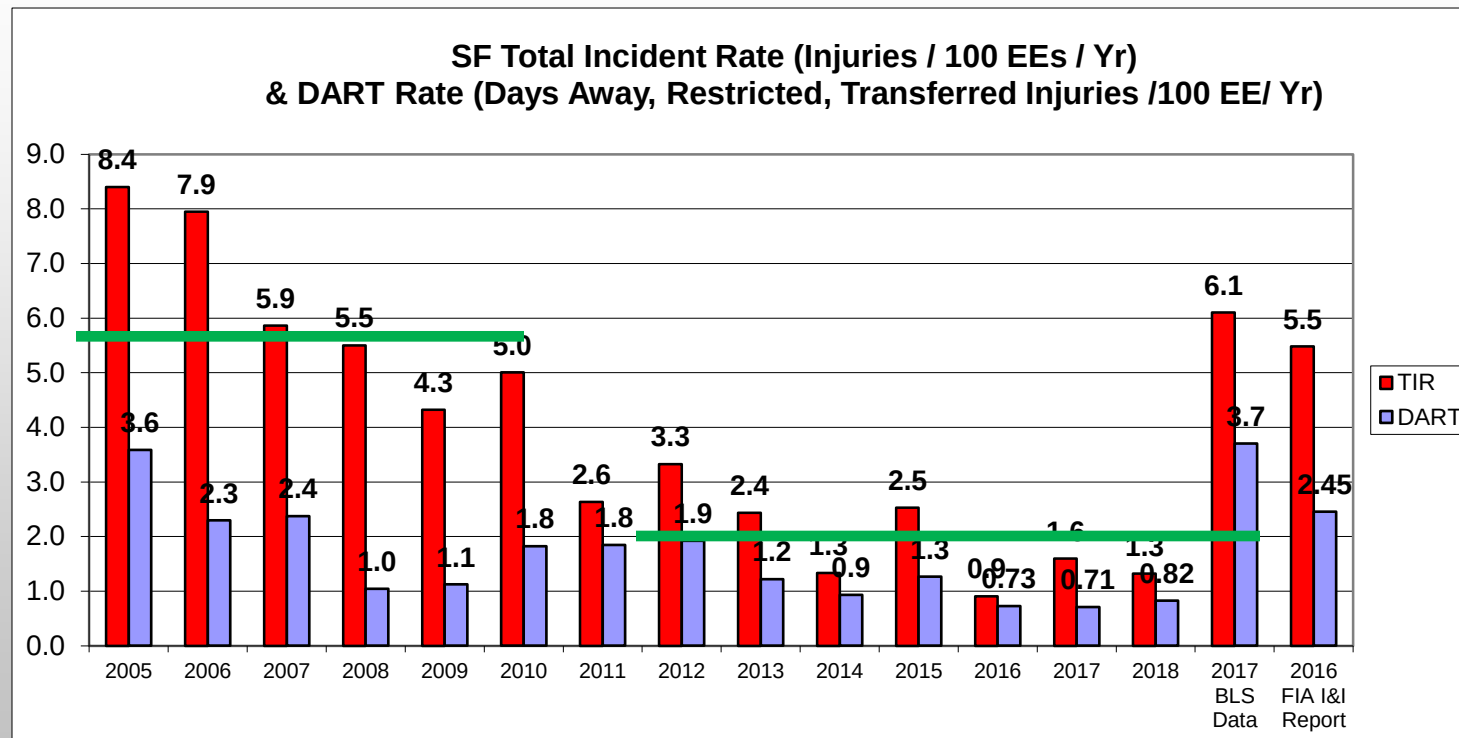
The Impact Of Helping People Learn To Make Better In-The-Moment Decisions

The Impact Of This Approach

100 Month Comparison of Company-Wide Injury-Free Months



Step Change Improvement



Which helped lead to this...

Scot Forge was honored to be recognized by *EHS Today Magazine* as one of America's Safest Company



But ultimately this is what's most important...

2016/2017 – First plant in our history goes 365 days without a recordable.

2017/2018 – First plant repeats with a 450 day run and a second plant ran over 650 days without an injury.

It's done with the mindset that people don't have to get hurt to do what we do.

It is being done as we expand our workforce by 20% since January 2018.

Which Began To Change The Company's KPI's

Operating Profit ★

On Time Delivery ★

Quality Performance ★

Employee Retention ★

Employee Engagement ★

2016-2018

Experience Modification Rate: 0.48

Engagement Survey Results: Safety Culture rated as one of the highest positives in the survey.

QUALITY INSIGHT

Quality Is Behavior Based Too

The same states and critical errors cause us problems in both safety and quality.

You can apply the same cure (the *CERTs*) to improve two key areas of your operation simultaneously.

We wrote and trained all personnel in a module that applied *Safe*Start principles to improving quality.

Application of Concepts

At the end of BQ training we asked:

What will you do differently, purposefully, and consistently to help us deliver to our customers what they ordered, when they want it?

This question emphasizes that each of our employees play a role in making a daily impact for our customers.

BQ Projects Started A Revolution

- Each of us worked on a behavior or action to improve our quality and delivery performance.
- The scope of what we took on was targeted, measurable, and took on a current issue.
- Improvement approach was based on the four Critical Error Reduction Techniques (CERTs) because we targeted behaviors.
- Projects were completed by teams or individuals.

Applying Principles to Quality

126 BQ Projects completed in late 2015

Defective Parts Per Million (DPPM)

- 2015: Baseline
- 2016: -37% of baseline
- 2017: -48% of baseline
 - Significant increase in business versus 2016
- 2018: -67% of baseline

The Keys To Sustaining The Gains?

- Get everyone actively involved
- Integrate it into everything you do
- Reinforce it daily in words and actions
- Make it the new “way we do things around here” and then never stop trying to improve it

Daily Quality Triggers

Take it Right

- Quick Visual Inspection (check defects and marking)
- Review all documentation (Revisions, Avail)
- Ensure you have all information to be successful
- Understand. If you don't, ASK

Make It Right

- Execute per instructions (proceed only with clarity)
- Leverage your training
- Check your in-process work (Times, temps, offsets, dimensions...)
- How matters for many customers!

Pass It Right

- Inspect your work with critical view
- Complete reporting before part leaves
- Document defects with NCRS
- Build rework plans before the parts leave
- Protect our customer

Daily Reinforcement Is The Key To Long Term Success



SG PLANT: 105 282 RECORDED SAFETY INSPE

RECORDABLE INJURIES	MINOR INJURIES	EQUIP DAMAGE	NEAR MISSES	DAYS W/OUT A RECORDABLE INJURY
LAST 24	LAST 24	LAST 24	LAST 24	555
YTD	YTD	YTD	YTD	555
COMMENTS Carl...0 Dallas...0 Phil...0 Josh...0 Sean...0 Jesse...0 Rachael...0 Jesse...0				
TZ CARDS PER WEEK ACTUAL 15 TARGET 15				
TZ CARDS PER MONTH ACTUAL 36 TARGET 36				
TODAYS HIGH RISK Balance/Traction/Grip - Make sure parts are stable on the tables				
COST April \$37,680 MAY \$46,726 June Goal \$45,000				

WINE SHOP QUALITY

LAST 24	MTD	YTD
NC'S 0	10	21
$(139 + 78 + 241 + 40) / 2410 \times 1M = 29.62$ $(54 + 44 + 31 + 24) / 12 \times 1M = 71.00$		
COMMENTS Clocking Holtec's on 79 Keep mind on Task Double check prints		
PRODUCTIVITY 90 99 95 85 Planned 100		

Every shift and every department will identify high risks of the day in safety and quality and often express them in SafeStart terminology, to use in their shift kickoff meetings.

Customers' Responses

Increased:

- Repeat orders
- Opportunities to make never before made forgings.
- Opportunities to make forgings currently made by other suppliers.
- Opportunities to convert castings to forgings.