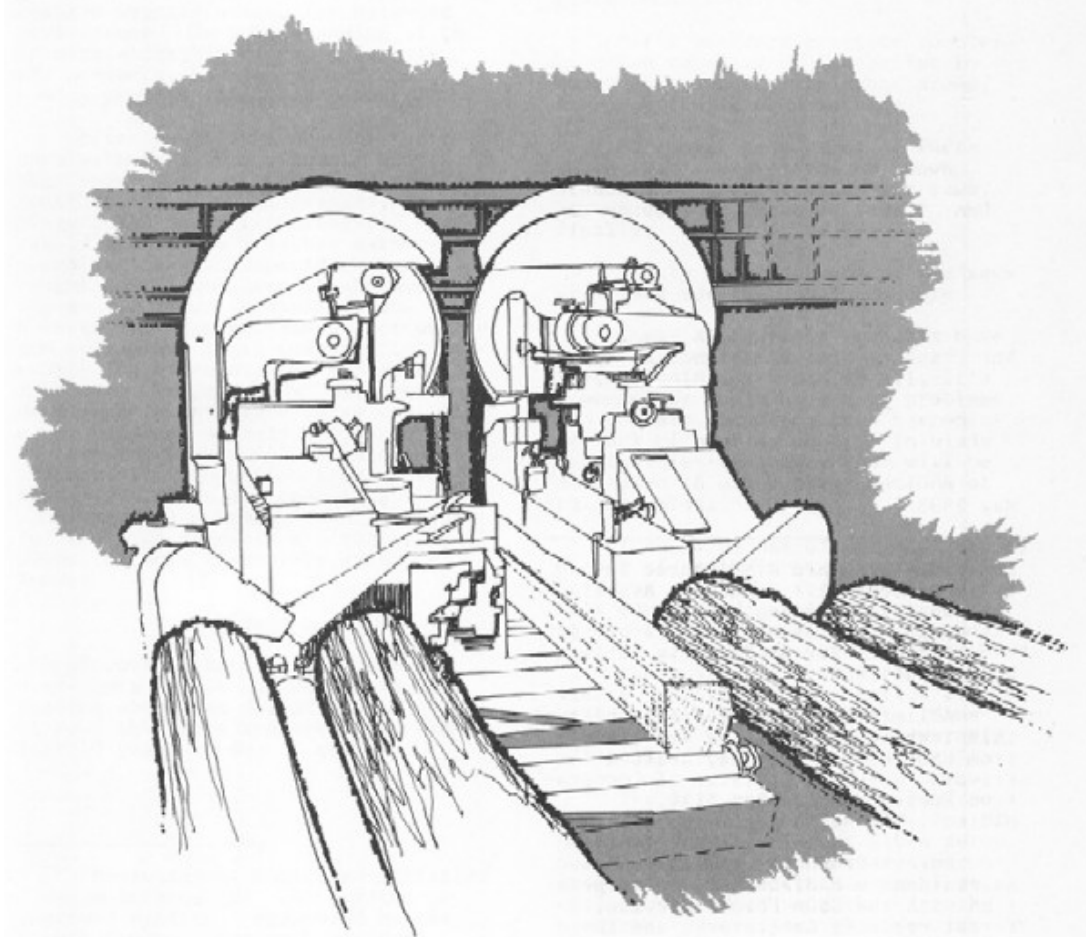
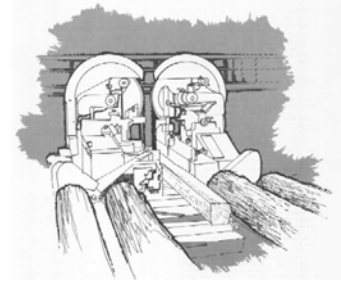


# Case Study 1: Large Western Pine Mill



# Case Study 1: Large Western Pine Sawmill

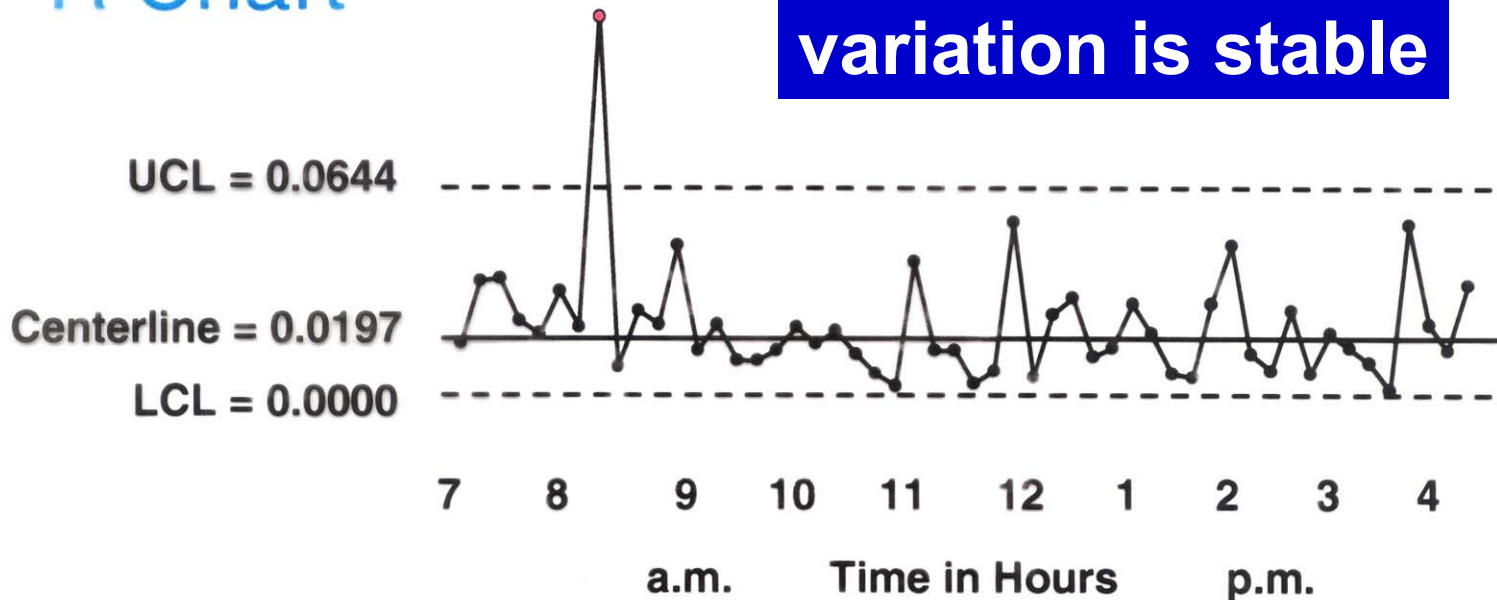
- 75 MMBF annual production (log scale)
- Clears, Shop, Boards, Dimension
- USFS timber valuation study
  - Lumber size statistics
  - Headrig results



Average Measured Size ( $\bar{X}$ )	1.532 in.
Total Variation ( $s_t$ )	.044 in.
Between-Board Variation ( $s_b$ )	.036 in.
Within-Board Variation ( $s_w$ )	.025 in.

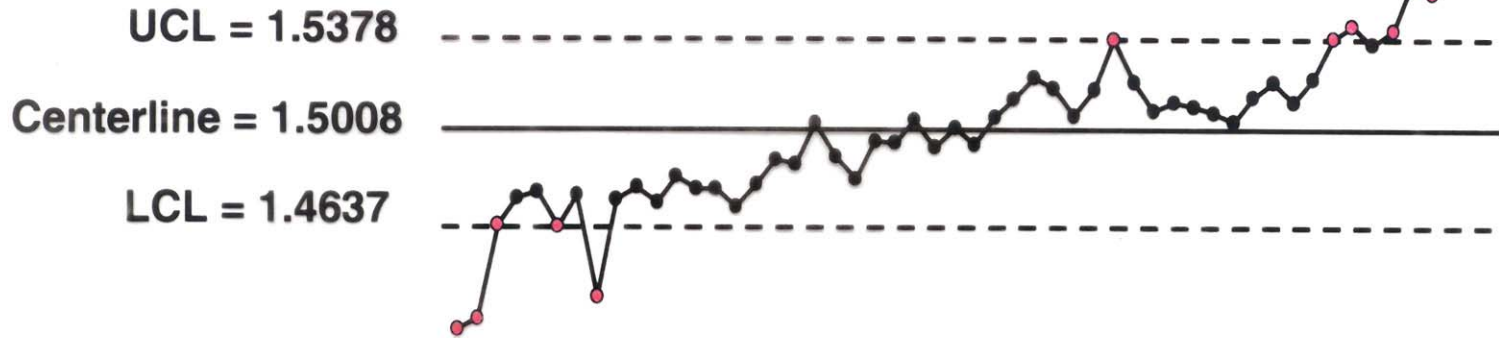
# Case Study 1: Large Western Pine Sawmill

## R Chart



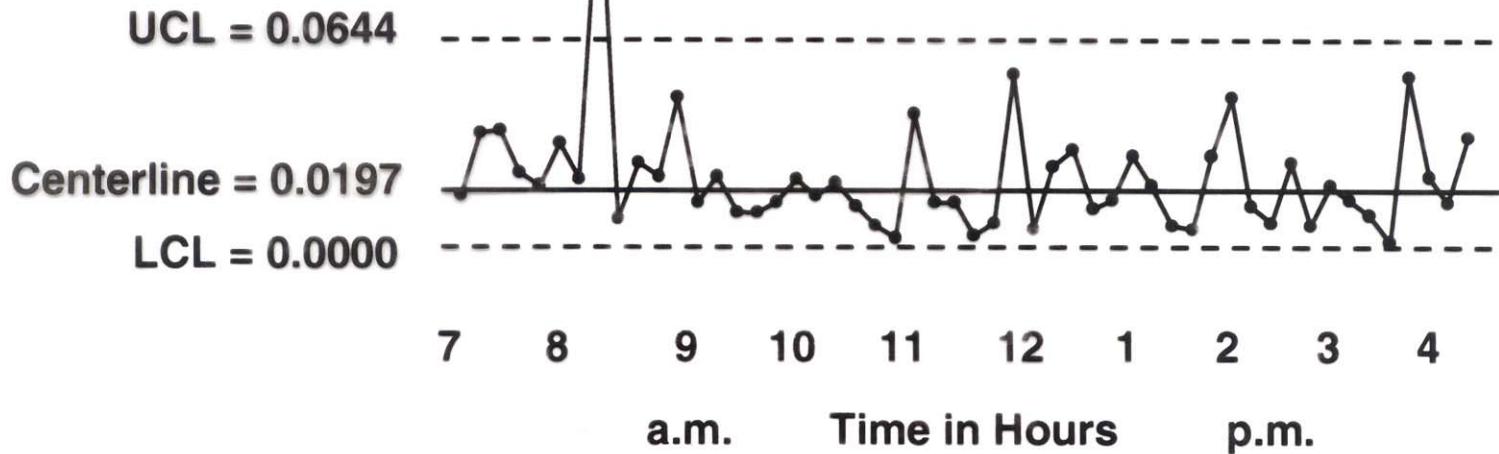
# $\bar{X}$ Chart

**Drift in process average**



# R Chart

**Between-board variation is stable**

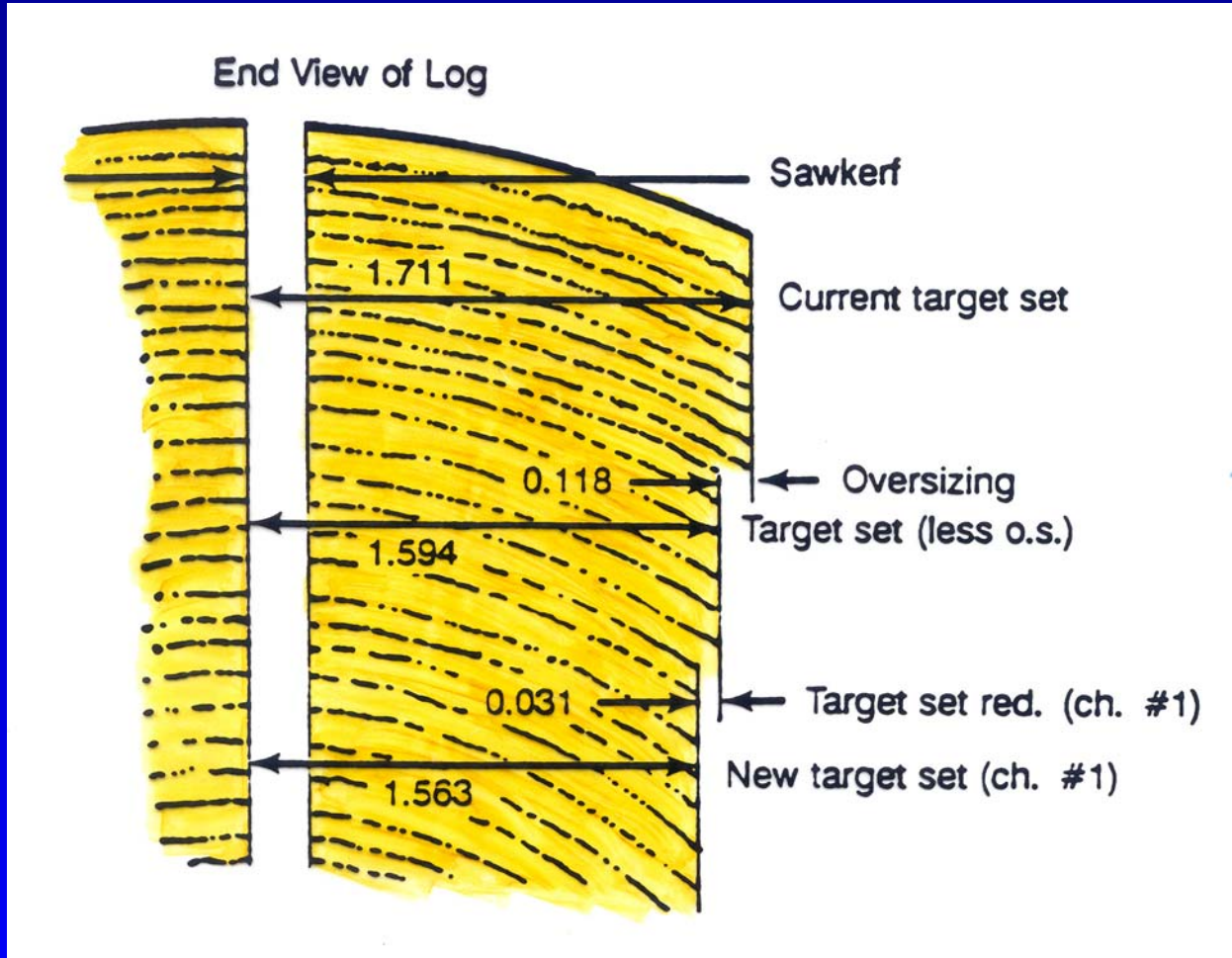


# Case Study 1: Large Western Pine Sawmill

## Statistics Before & After Corrective Action

	<b>Before corrective action</b>	<b>After corrective action</b>
Average measured size	1.532 in.	1.501 in.
Total variation	.044 in.	.026 in.
Between-board variation	.036 in.	.011 in.
Within-board variation	.025 in.	.023 in.

# Target Set Reduction



# Cast Study 1: Western Pine Sawmill

- Headrig—gradual lumber thickness increase throughout the 1<sup>st</sup> shift
- During 1<sup>st</sup> shift—cold hydraulic oil expanded as it warmed up, causing drift in linear position networks
- Corrected within one week for less than \$10K
- Cut total variation over 40%
- Recalculating target size—increased the mill's overall recovery by 0.4%

# Cast Study 1: So What's the Payback?

## What is a reasonable payback period?

- 0.4% annual log savings =

$$75 \text{ MMBF} \times 0.4\% = \underline{\hspace{2cm}} \text{ MMBF savings}$$

- Translate this into real dollars

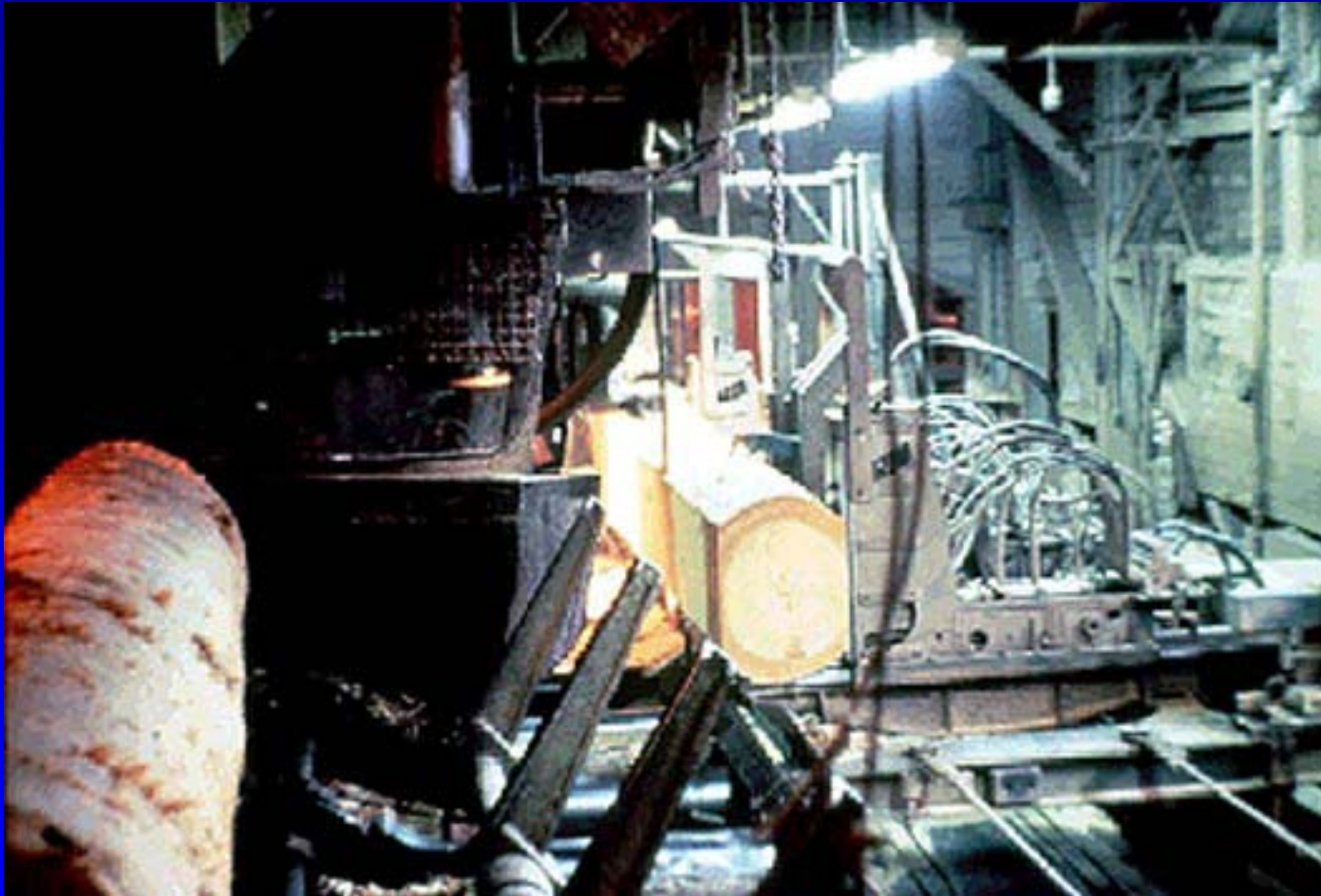
$$300 \text{ MBF} \times \$\underline{\hspace{2cm}}/\text{MBF log cost}$$

- What's the payback period

$$\$10\text{K} / \$150\text{K} \times 250 \text{ days} = \underline{\hspace{2cm}} \text{ days}$$

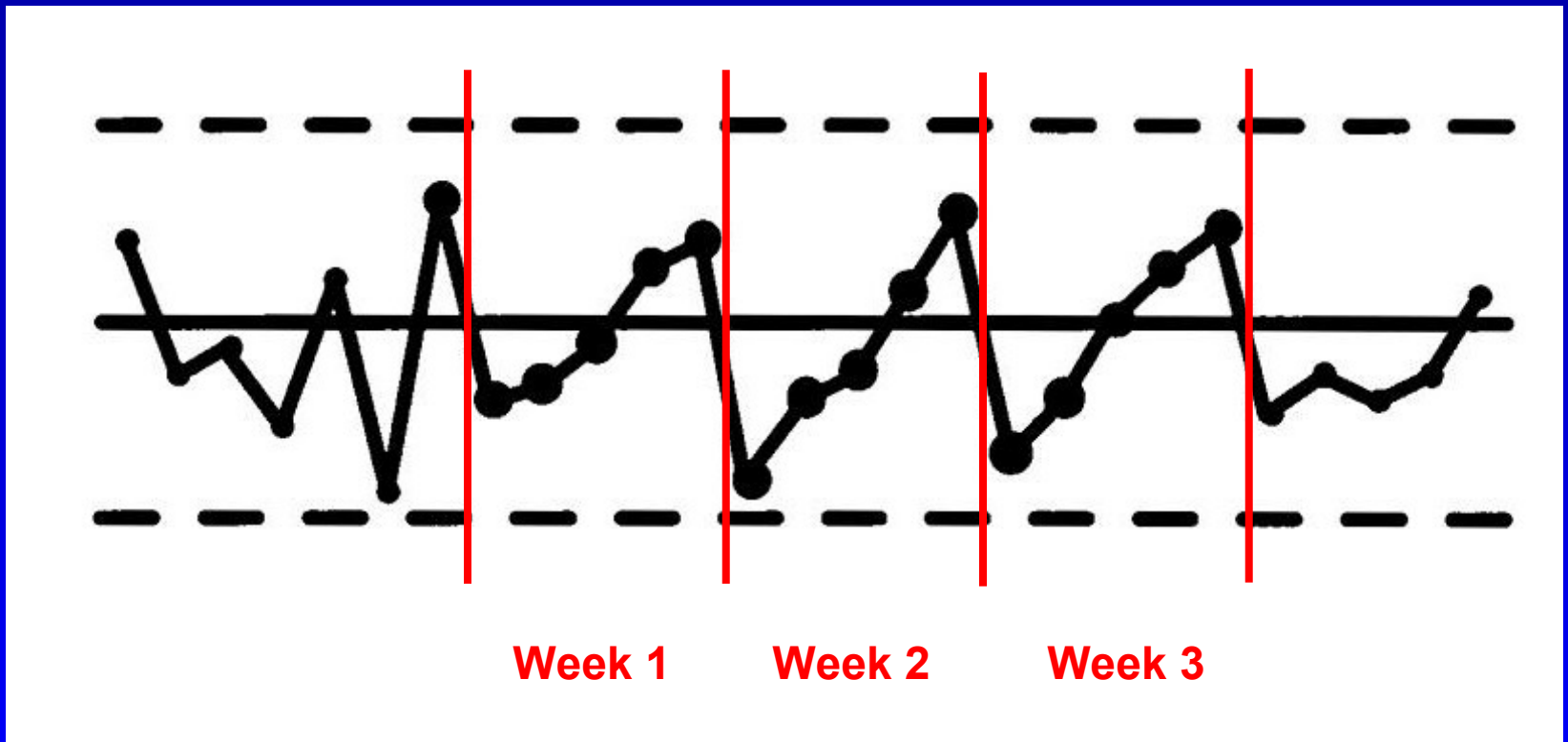


# Case Study 2: Medium-Size Softwood Dimension Mill



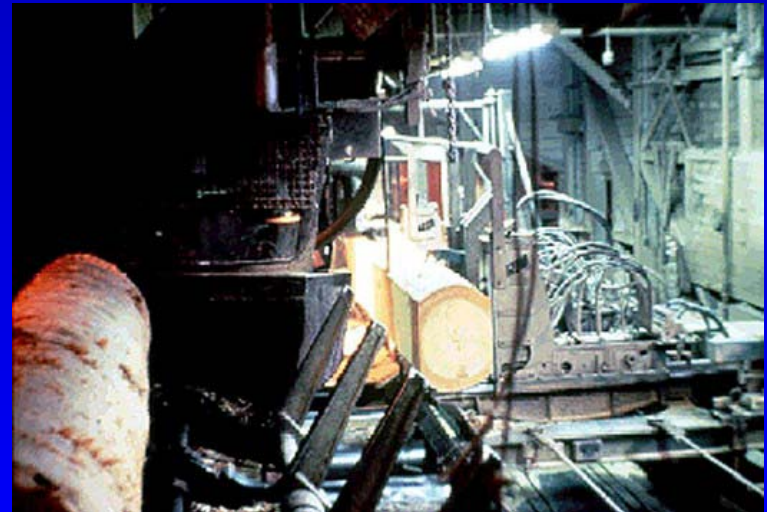
# Case Study 2: Medium-Size Softwood Dimension Mill

## Day-to-Day Gang Edger Total Variation ( $s_t$ )



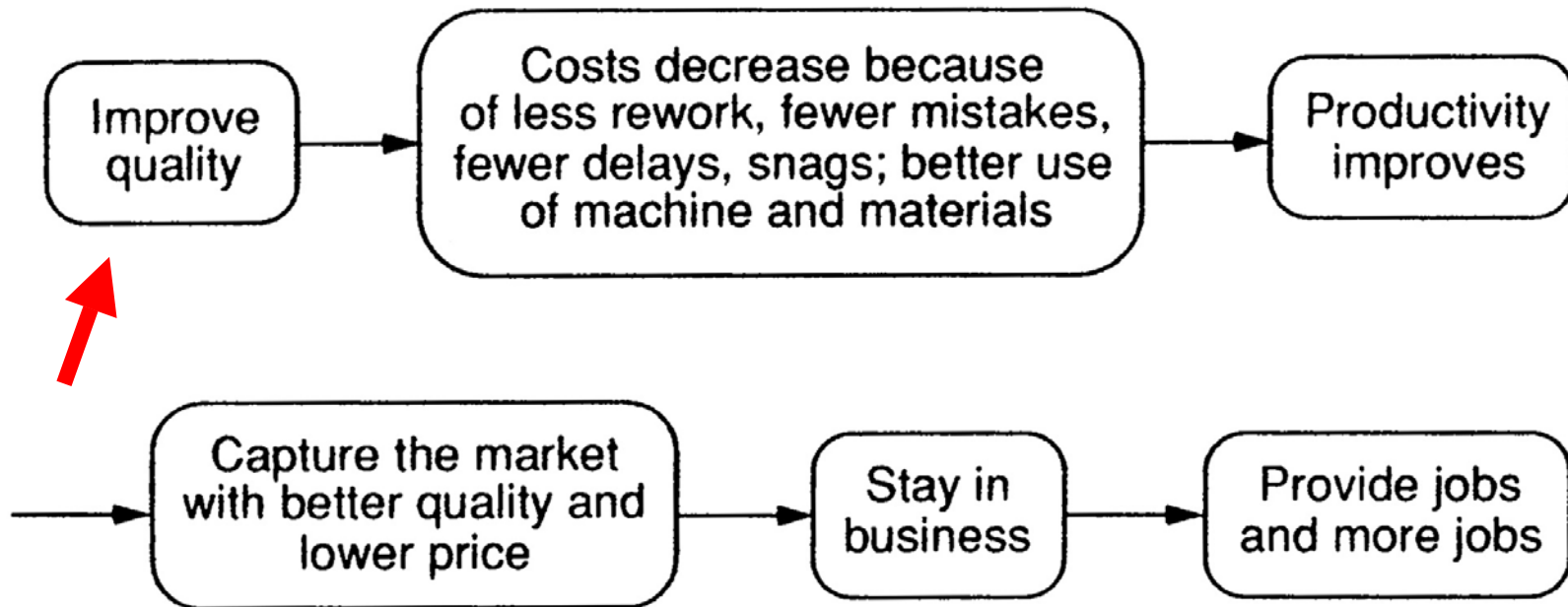
## Case Study 2: Medium-Size Softwood Dimension Mill

- Sawfiling problem with gang edger
- Reduced sawing variation & target sizes
- Improved lumber recovery
- Able to purchase logs
- Mill was going to close
- Saved 80 jobs!!!



# Remember W. Edwards Deming?

## The Chain Reaction of Quality



—Deming, *Out of the Crisis*

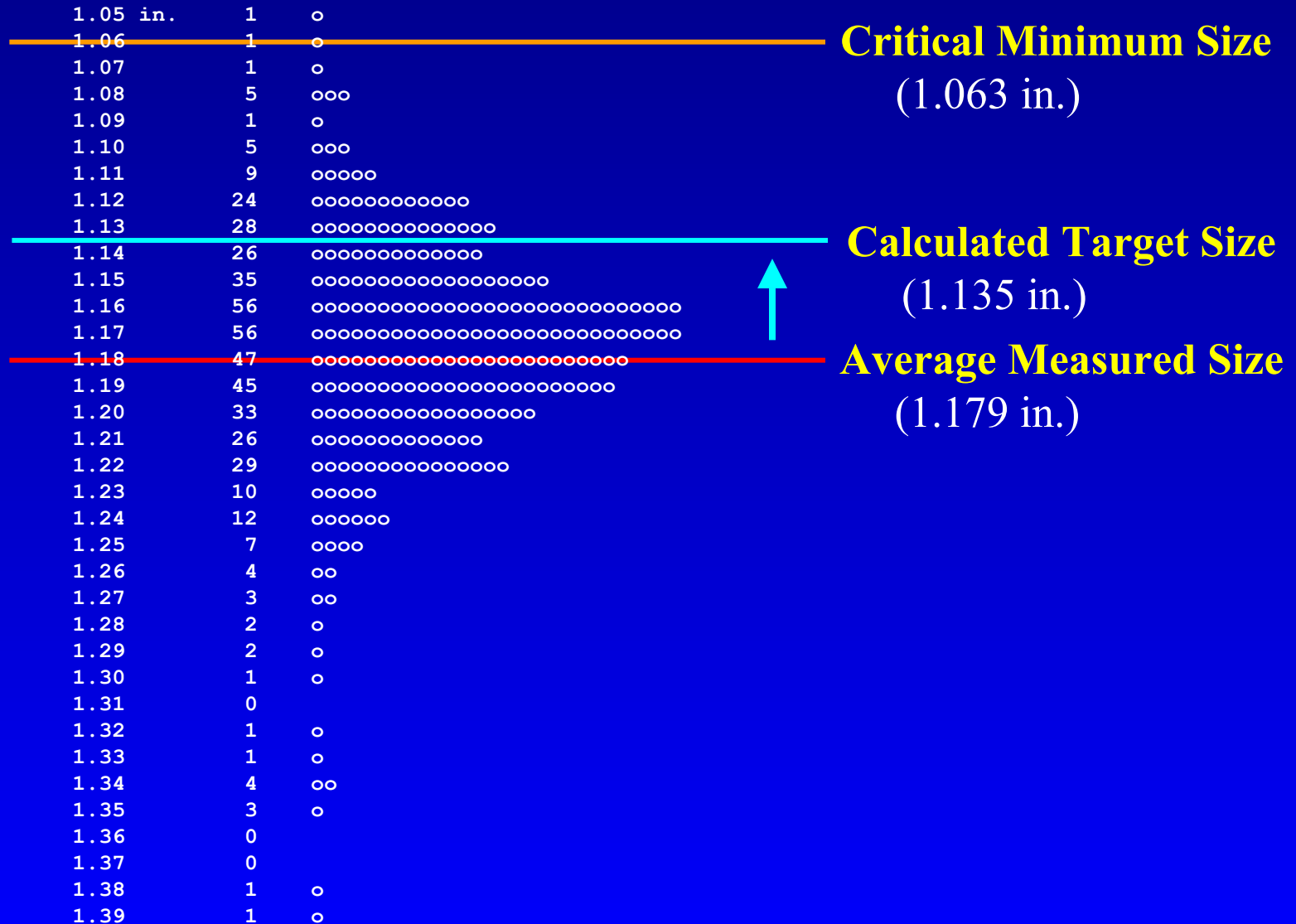
# Case Study 3: Medium-Size Hardwood Sawmill

- Improve process performance
- Sawing machine centers
  - Identify & locate problems
  - Improve sawing accuracy
- Increase lumber recovery



<b>Size control study</b>	<b>Circular saw headrig</b>	<b>Gang resaw (fixed saws)</b>
Operator target size	1.125 in.	1.125 in.
Calculated target size	1.135 in.	1.080 in.
Ave. measured size	1.179 in.	1.130 in.
Total sawing var.	0.044 in.	0.010 in.
Between-piece var.	0.037 in.	0.004 in.
Within-piece var.	0.023 in.	0.009 in.

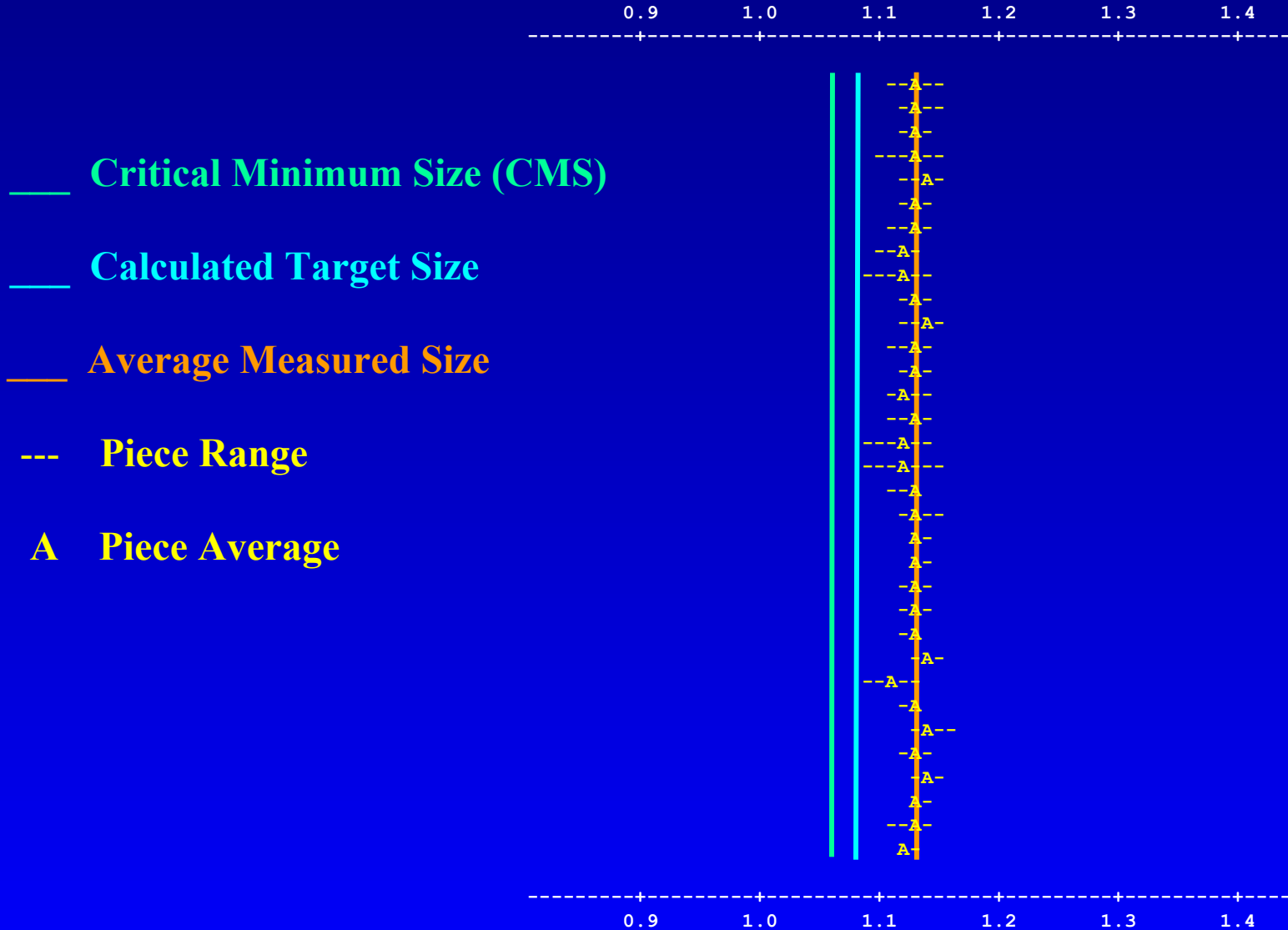
# Headrig 4/4 Oak Histogram



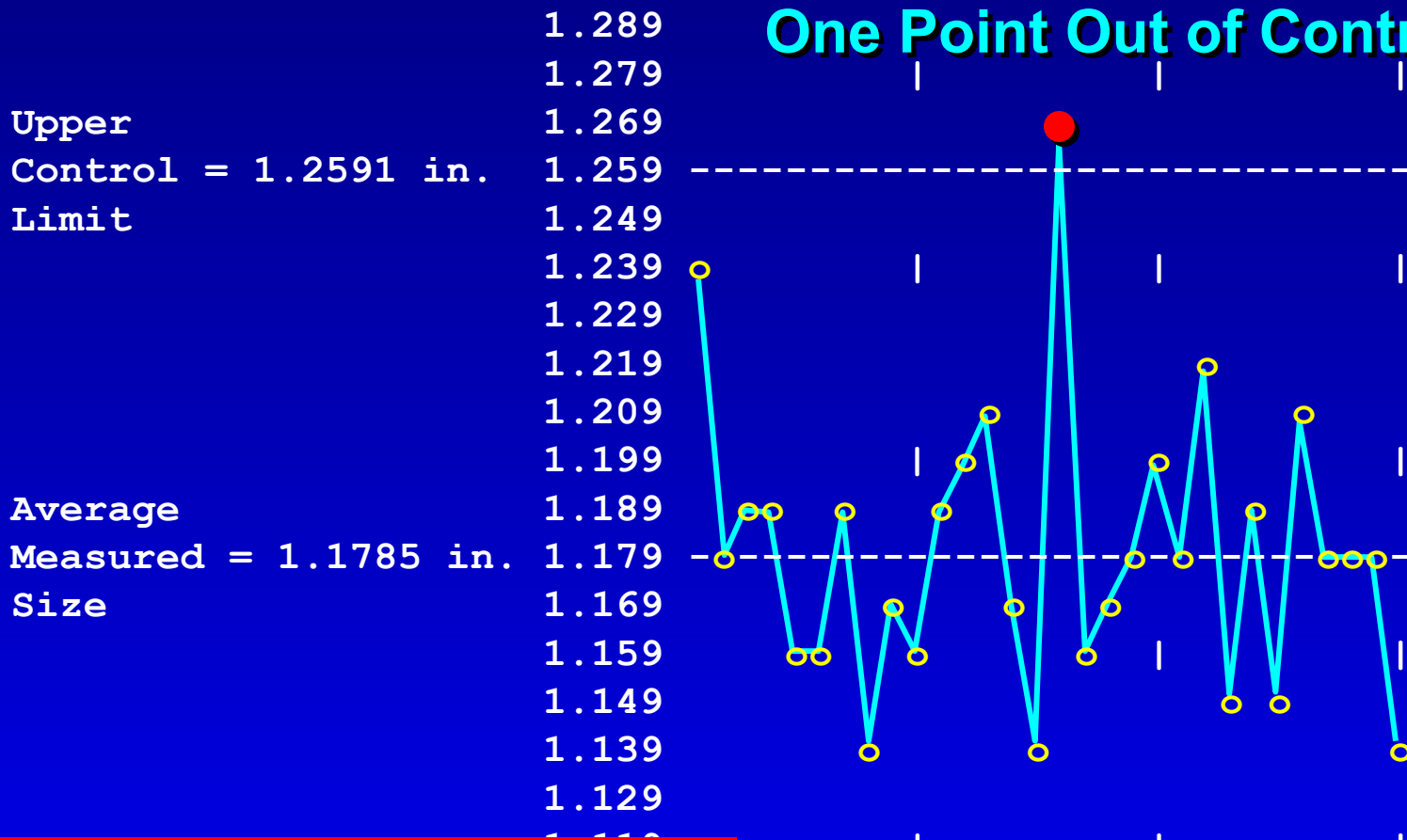




# Gang Edger 4/4 Oak Variation Range Graph



# Headrig 4/4 Oak - Average Control Chart

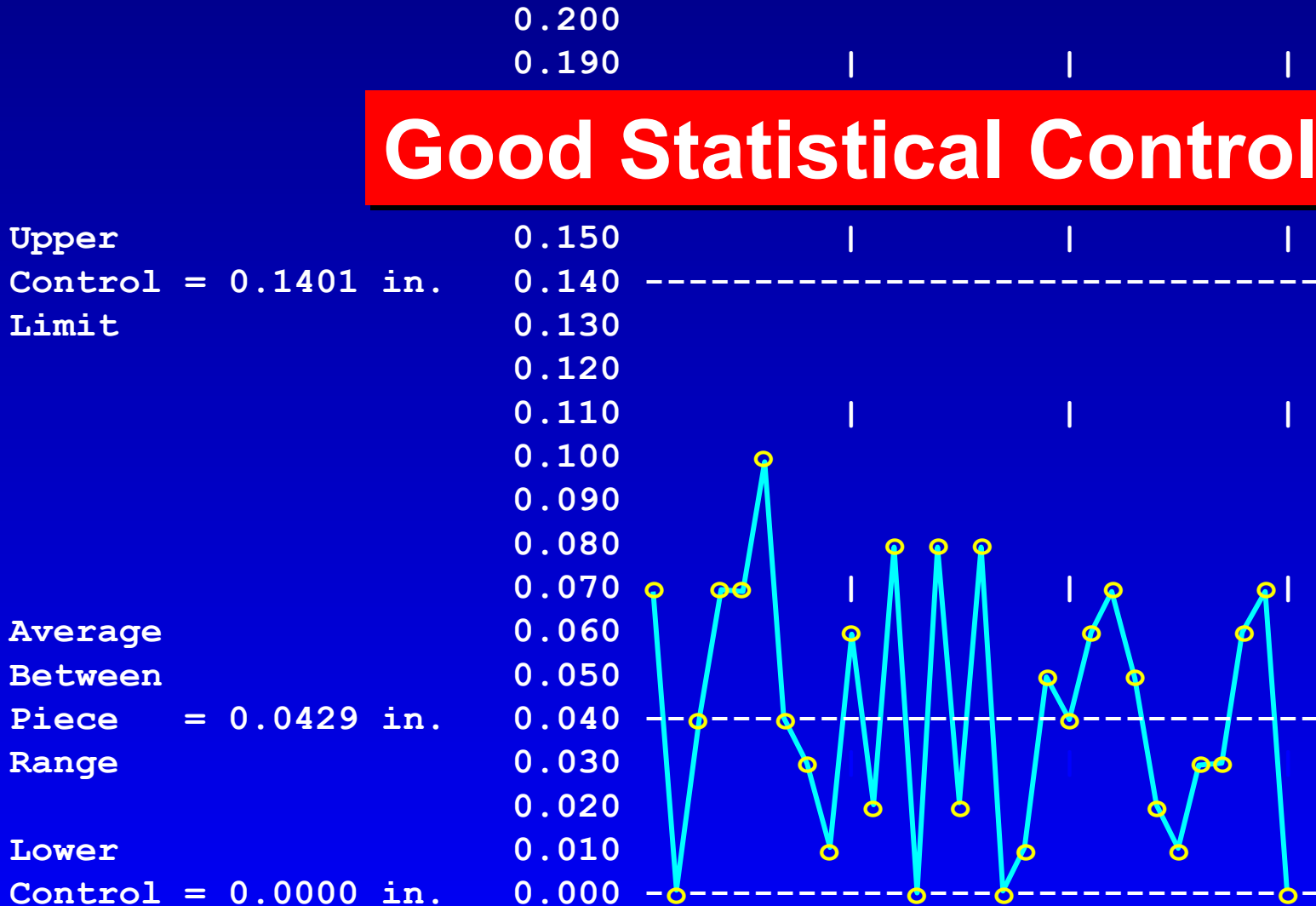


**Pretty Good  
Statistical Control**

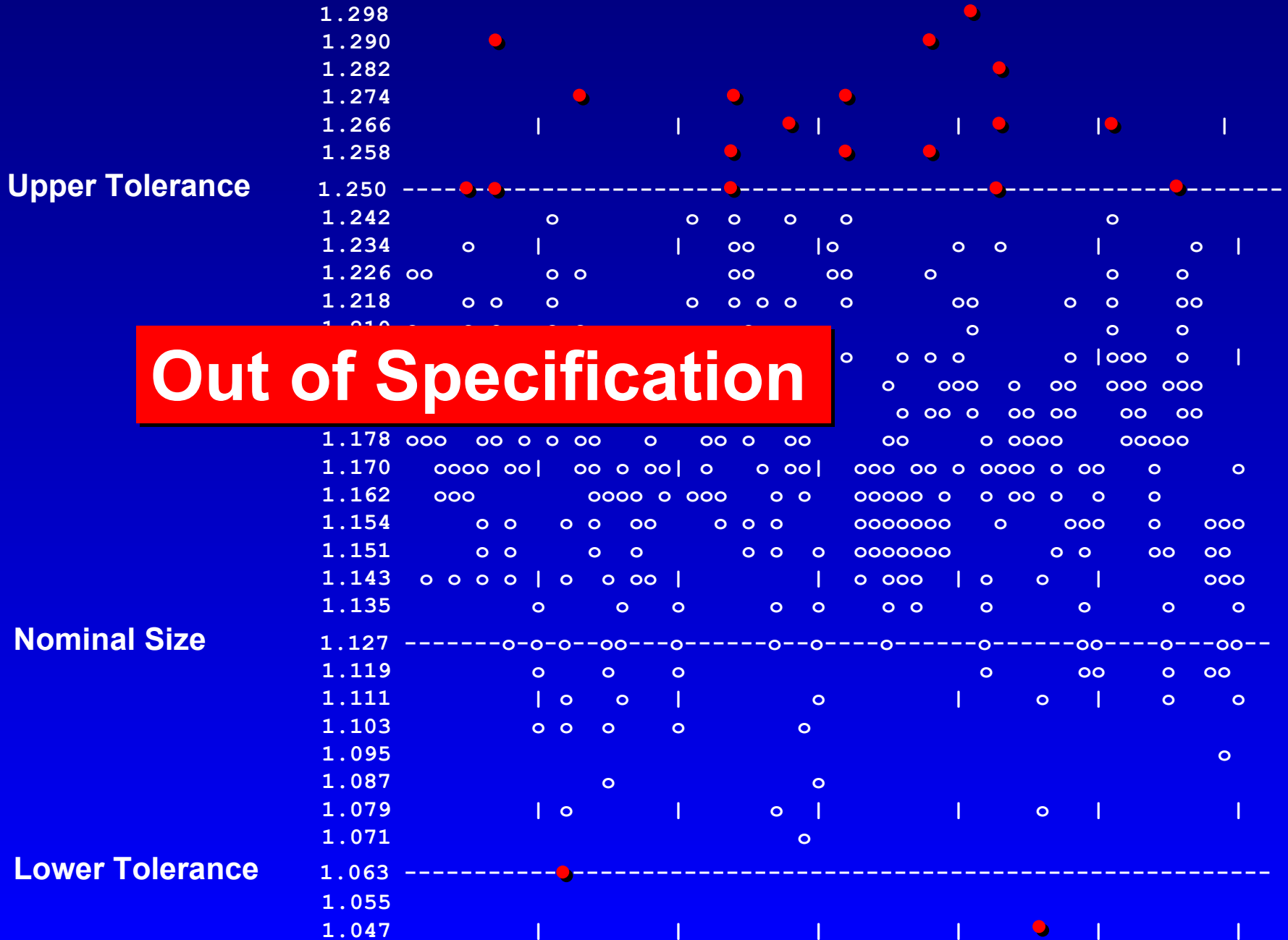
1.069

# Headrig 4/4 Oak - Between Piece Control Chart

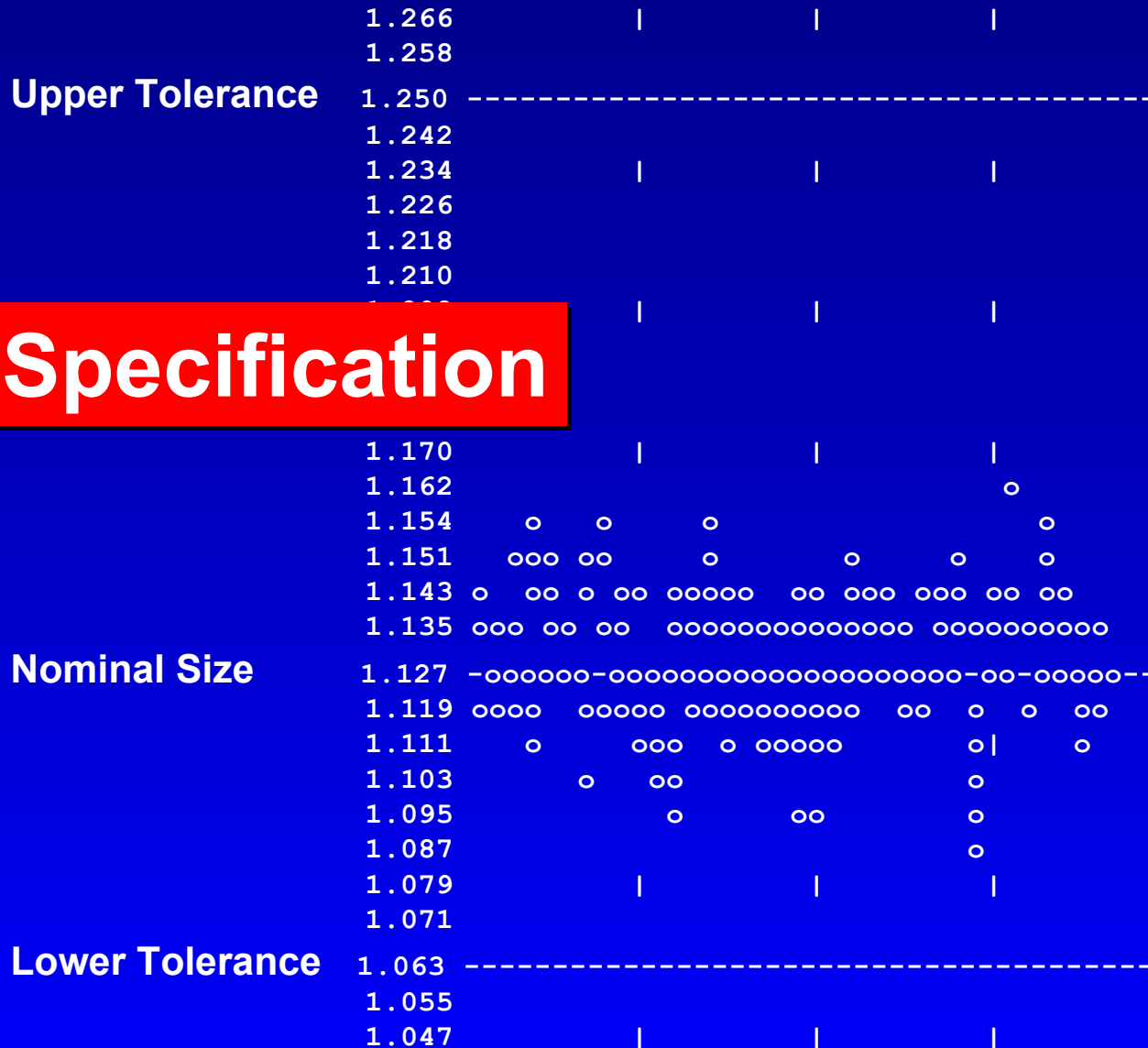
**Good Statistical Control**



# Headrig 4/4 Oak Specification Chart



# Gang Edger 4/4 Oak Specification Chart



**In Specification**

# Case Study 3: Medium-Size Hardwood Sawmill

- Headrig
  - Good statistical control—however...
  - Does not accurately saw lumber
  - Setworks need to be replaced & tracks straightened
  - Adjust target size after repairs (improve recovery)
- Gang edger
  - In good repair
  - Accurately saws lumber



# Case Study 3:

## Medium-Size Hardwood Sawmill

- Mill replaced headrig carriage & tracks
  - Able to secure financing for upgrading the mill
  - Improved lumber recovery
  - Accurately sawn lumber
  - Fewer customer complaints about thick & thin lumber

# Case Study Conclusions

## What is the common ground for success?

- Results-driven—no elaborate company-wide activity-focused quality program was necessary for achieving measurable bottomline results
- In each case study
  - A problem was identified and a solution formulated
  - Appropriate corrective action was taken
  - Measurable results—the problem was solved!
  - Bottomline business performance improved
- Positive results were captured quickly



# **Results Driven Approach to Improving Quality & Productivity**

# Overview

- Too often quality programs center on activities rather than results
- Quality programs are easily derailed when the focus is activity-centered
- Ends become confused with means—processes confused with outcomes
- Key to successful improvement is to focus on producing measurable results

# Activity-Centered Programs

Many companies spend vast resources on a variety of activities with little improvement in quality, productivity, or business performance. Payoffs are meager at best. Eventually companies abandon potentially useful QC techniques because the focus is on activities, not producing bottomline results.

# Results-Driven Efforts

Results-driven efforts bypass lengthy preparations and aim at quick, measurable gains. Investment is less. Improvement goals are short term. Top management takes action because they lead directly toward improved results—not promises of someday hopeful gain.

# Key Benefits of a Results-Driven Approach to Improvement

- Quality improvement tools are introduced only when needed
- Trial & error reveals what works
- Frequent reinforcement energizes the improvement process
- Management builds on previous successes

# Start With One Project & Do Something!

1. Get top management commitment to solve one quality problem
2. Form an improvement team to solve the problem—**who?**
3. Use problem-solving methodology
4. Solve the problem—**Do Something!**
5. Report results & acknowledge the team
6. Disband the team
7. Build on success—**next problem**

# Final Thoughts

## An Important Definition

**INSANITY**—doing the same things the same way and expecting to see a difference.

—Roger Miliken

# Final Thoughts

## Sawmilling is a Complex Business

Sawmilling is all about doing the right thing most of the time—success is ALL in the details.

Of all the primary wood breakdown industries, sawmilling offers the greatest number of ways to convert logs into useable products

In other words—sawmilling offers the greatest number of way to screw up



# Final Thoughts

## Quality or Else

It takes commitment, time, money, and lots of energy to convert the promise of potential into power of performance.

It is not a question of can you afford to improve quality, but can you afford not too!

# **Final Thoughts**

**DO SOMETHING!**

**Just remember there are three kinds of people**

**...people who make things happen**

**...people who watch things happen**

**...people who wonder what happened**

