

Daring to Explore the Eco-nomics of Thinking Together

Presented by

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School of Forestry and Environmental Studies

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Abstract: The aim of this session is to offer insights on “new business economics” with applicability to “eco-nomics” and examples of individuals who have discovered how to improve business performance without neglecting environmental awareness.

Agenda

- Education / Background
- W. Edwards Deming
- Insights
- InThinking and Enterprise Thinking
- Better Value
- Possibilities
- Q & A





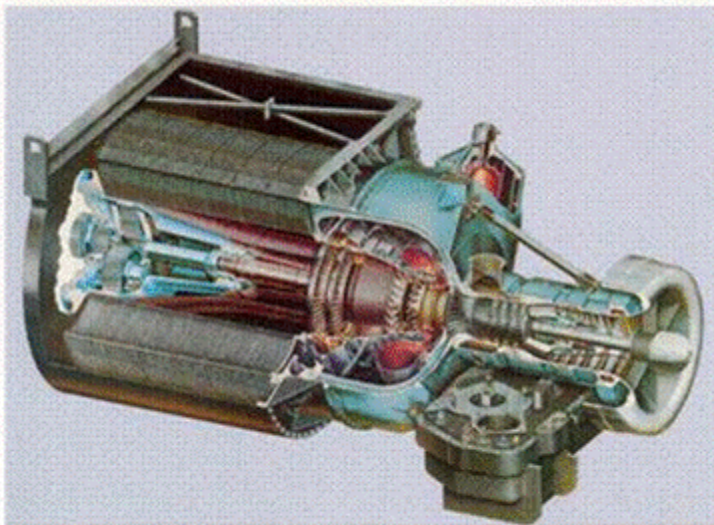
Education and First Job

- BSME, Rensselaer
- MSME, Rensselaer
- Ph.D., Rensselaer, Mechanical Engineering
- AVCO Lycoming, Stratford, CT - Heat Transfer Analyst

3-D Diffusion Equations

of Heat

$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} + \frac{\partial^2 T}{\partial z^2} + \frac{Q'''}{k} = \frac{1}{\alpha} \frac{\partial T}{\partial t}$$



AGT 1500 GAS TURBINE ENGINE

TEXTRON Lycoming
Stamford, Connecticut

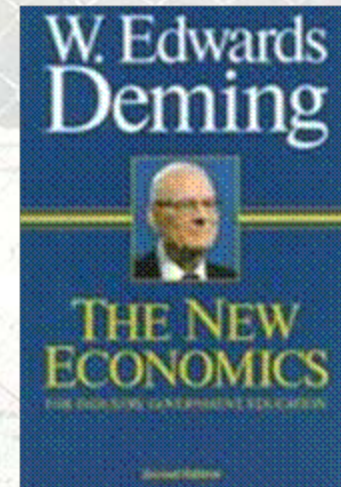
W. Edv



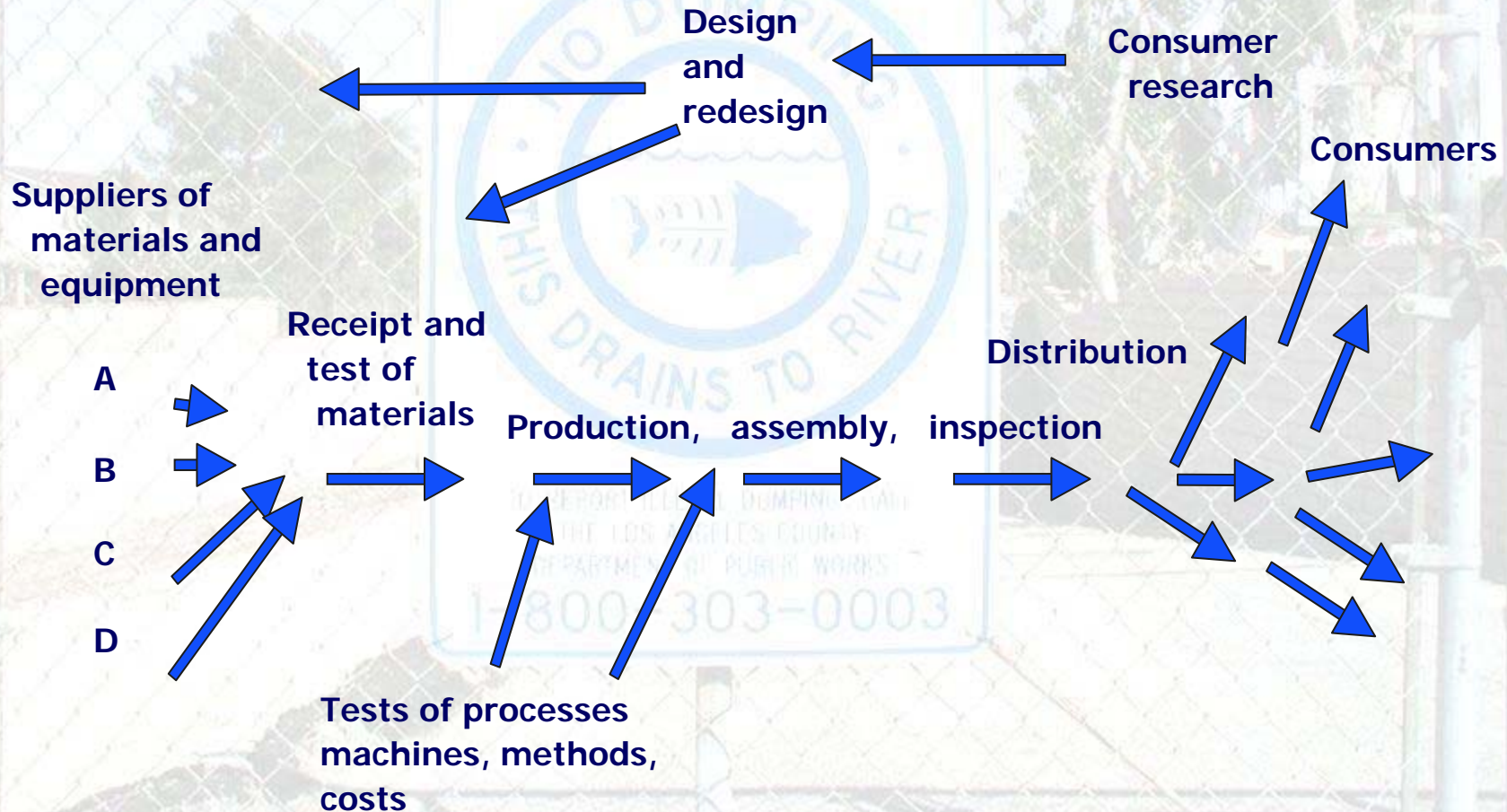
Powell, WY, 1904 - 1918



Yale and Beyond, 1928-1993



Production as a System



Source: The New Economics, W. Edwards Deming, 1993



We all live downstream

Deming and Toyota

“There is not a day I don't think about what Dr. Deming meant to us. Deming is the core of our management.”



These glowing words were spoken at the 1991 Deming Prize ceremony by Shoichiro Toyoda, president of Toyota Motor Corp.

Bridges





Genichi Taguchi on Quality

“Quality is the minimum of loss imparted to the Society by a product after its shipment to a customer”

Role

Introduce the *potential energy* of
integrating the management
theories and thinking of

W. Edwards Deming



Genichi Taguchi

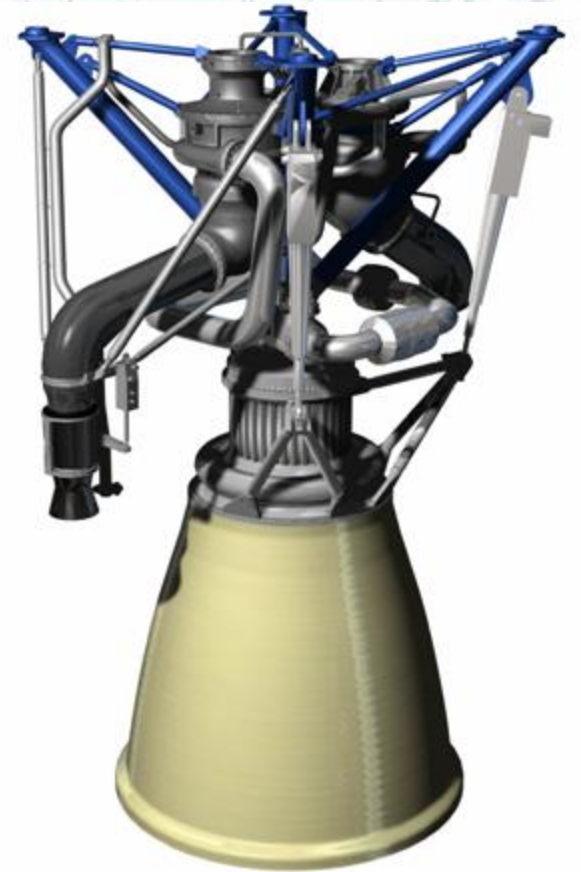
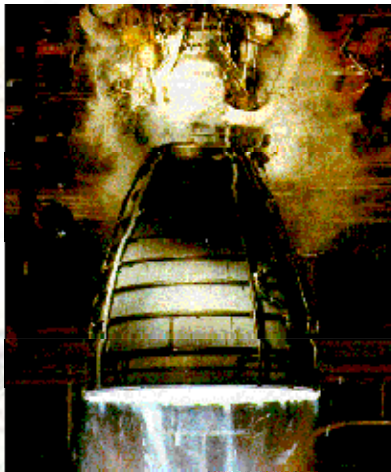


Edward de Bono

and many others...

Transformation

Potential Energy
"Better Thinking"



Kinetic Energy
"Better Value"



The First Step

“Once the individual understands the system of **profound knowledge**, he will apply its principles in every kind of relationship with other people. He will have a basis for judgment of his own decisions and for transformation of the organizations that he belongs to.”

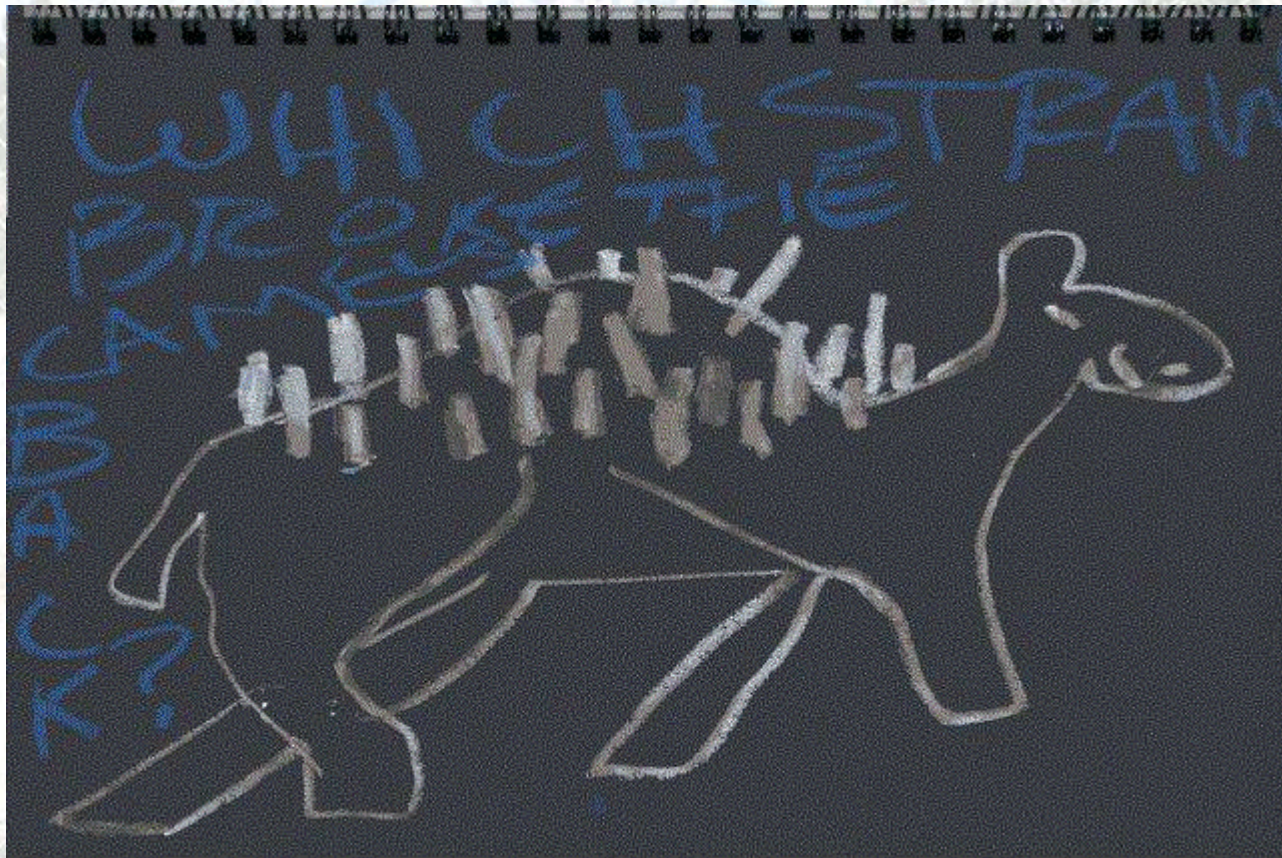
W. Edwards Deming

Source: The New Economics, W. Edwards Deming, 1993

Insights



Counting Straws



Causes & Effect

No single rain drop believes
it is to blame for the flood



Adding Rain Drops



Cause & Effect

- Pulse
- Exam Grade
- Football Results
- Business Results



Perception & Thinking

“How the world we perceive works depends on how we think.

The world we perceive is a world we bring forth through our thinking.”

H. Thomas Johnson

Source: Profit Beyond Measure, H. Thomas Johnson, 1999

Counting Heads



Togetherness

What does it mean to
“work together”?

What does it mean to
“learn together”?

What does it mean to
“think together”?



Team?



United We Stand



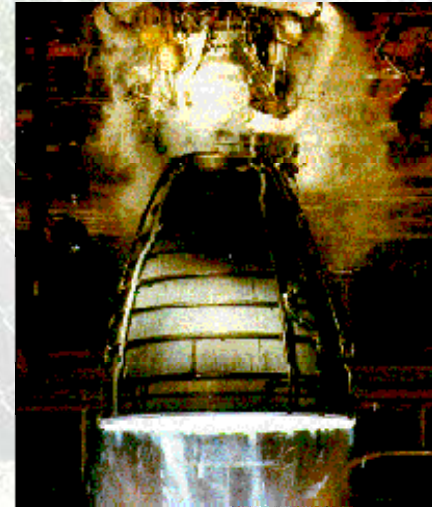
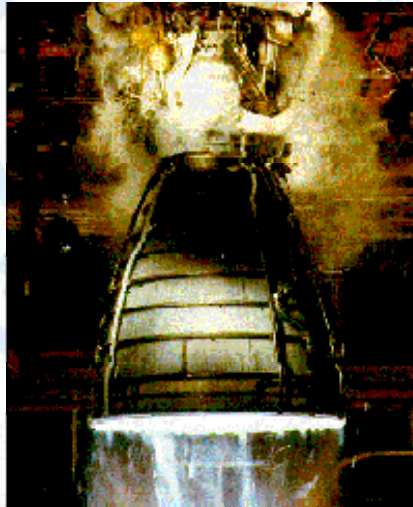
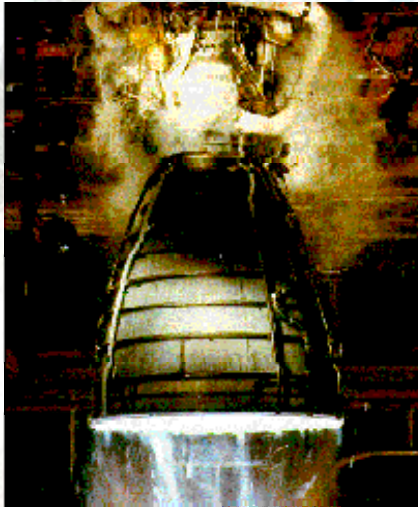
Philip Crosby on Quality

“Zero defects is another way of saying ‘do it right the first time’”

**Quality is defined as
conformance to requirements**

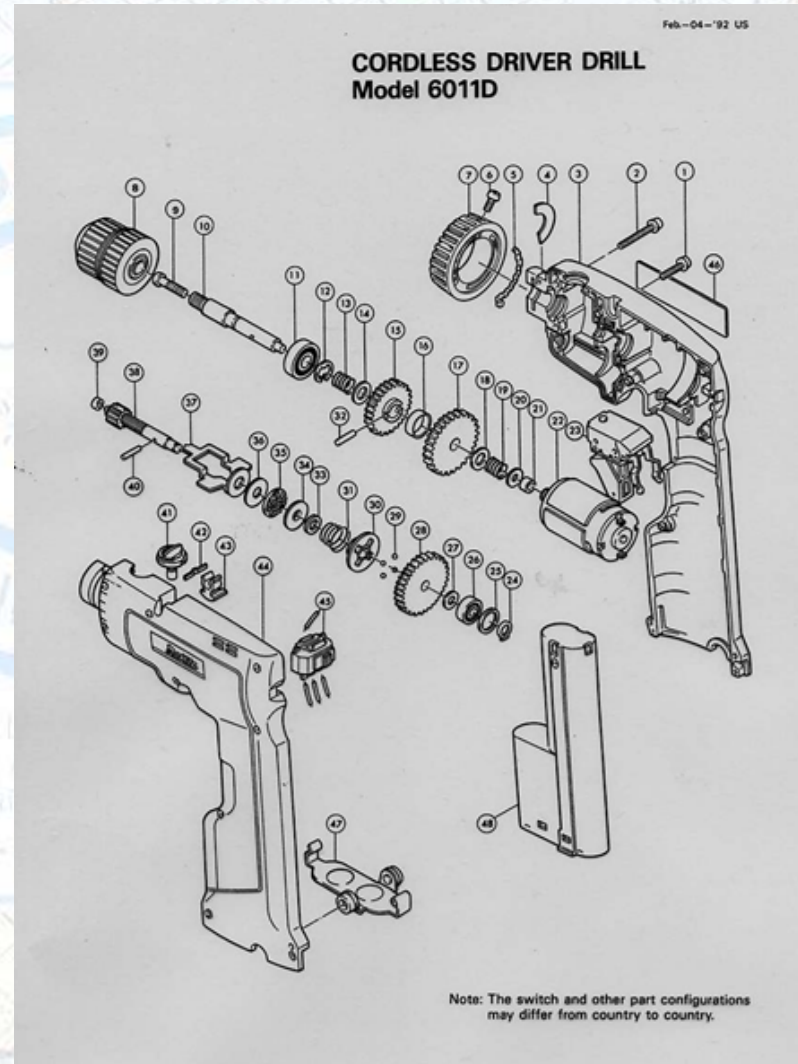


Interchangeable Parts ??

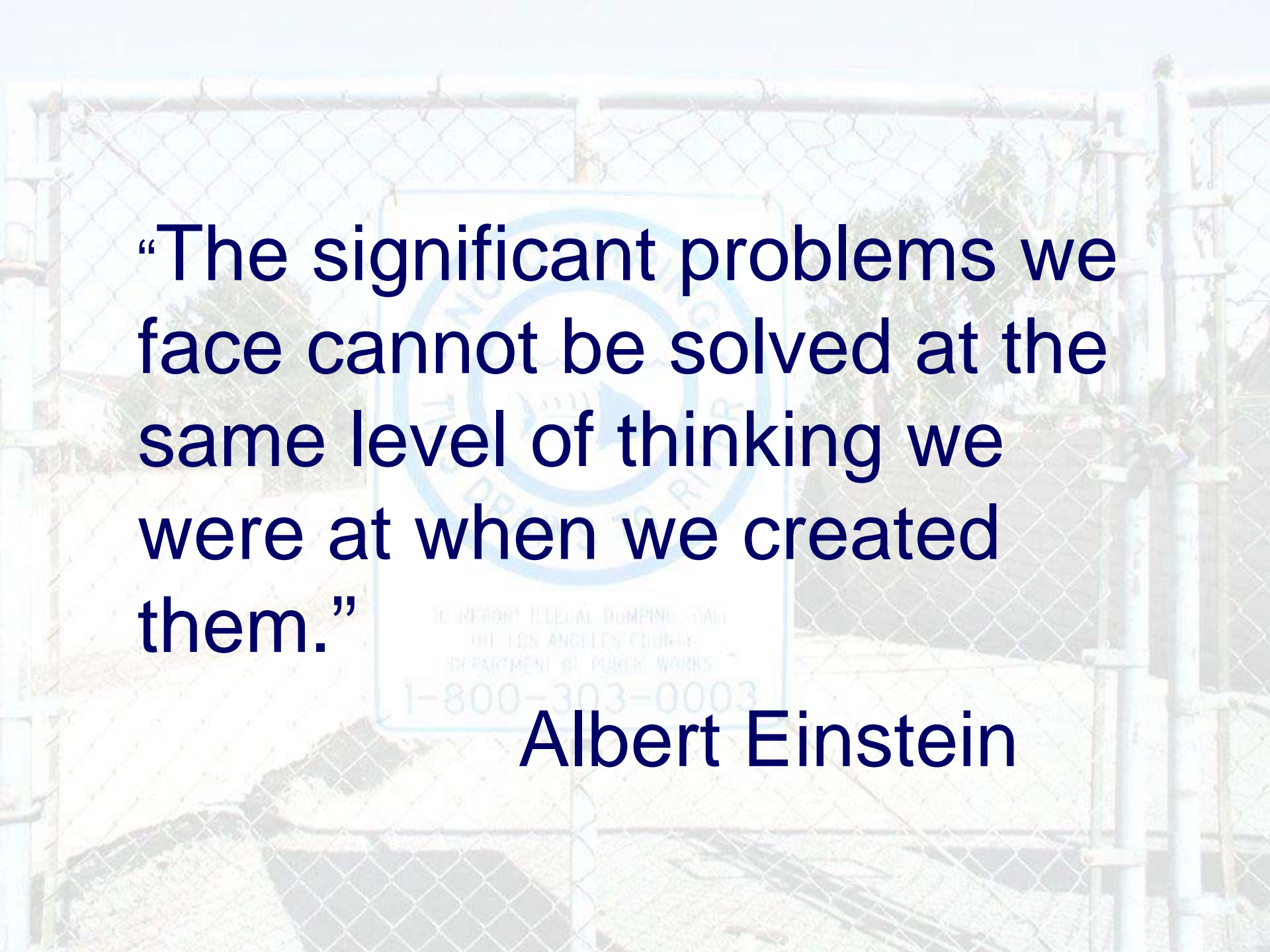


Space Shuttle Main Engine

Parts or Parts Of?







“The significant problems we face cannot be solved at the same level of thinking we were at when we created them.”

Albert Einstein



Resource Management



Cutting Wood

Given a piece of wood that will be cut into 2 pieces....

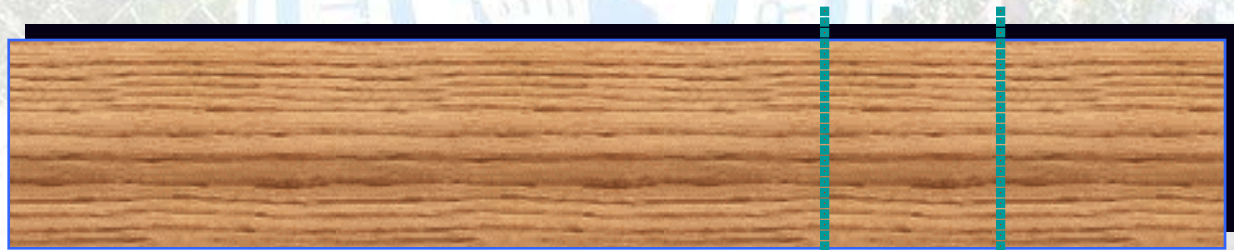


how many lines will be drawn across the top face before the cut is made ?

Cutting Wood

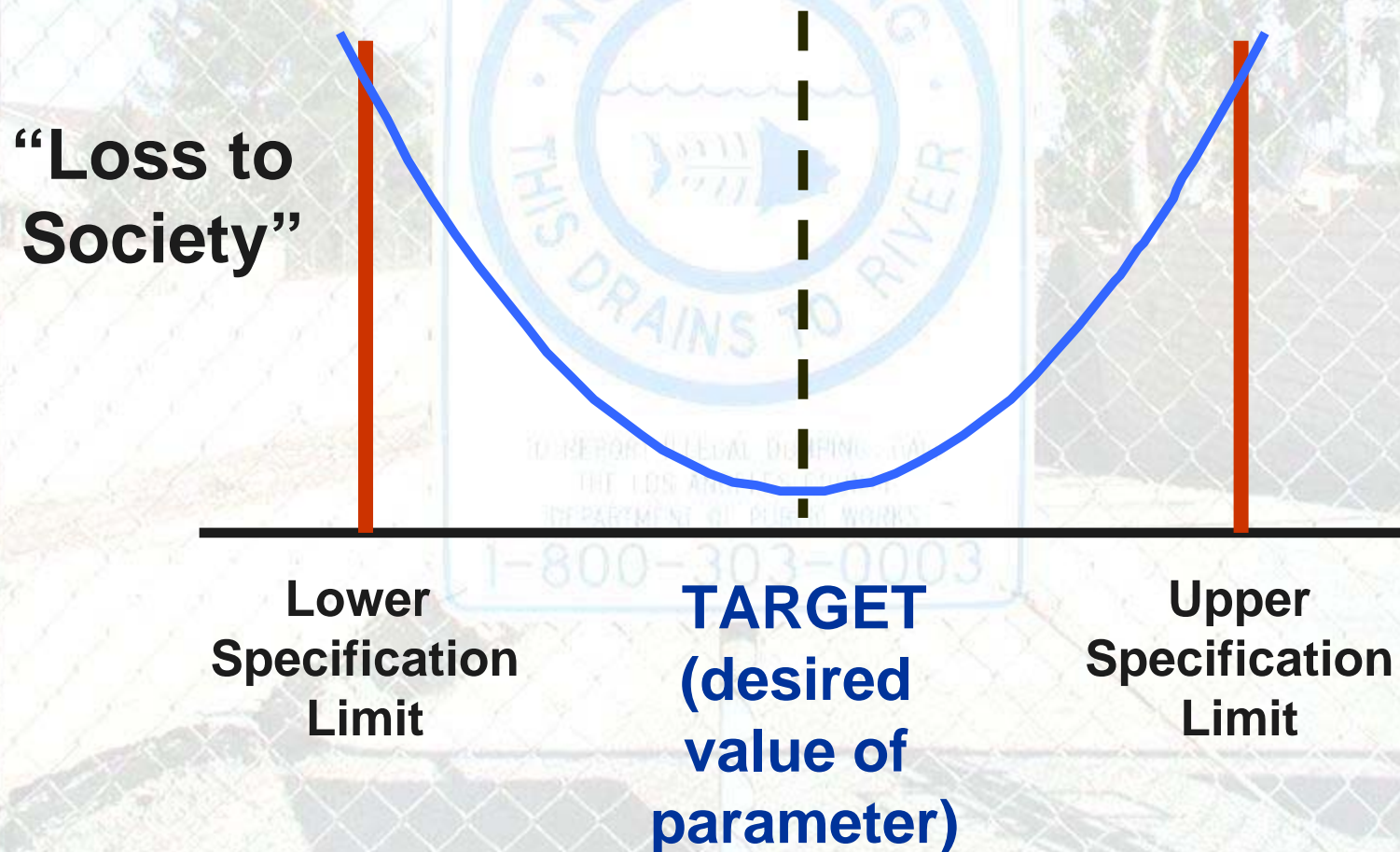


Cutting Wood



target

Taguchi's Quality Loss Function



A Better View

“The Taguchi Loss Function is a better view of the world.”

W. Edwards Deming

Source: *Out of the Crisis*, W. Edwards Deming, 1986



Picking Up Nails

**Spending time (yours)
to**

Save time (others)

***Minimizing Loss to
Society***

Investment Thinking

- Seeing connections
- Spending \$ to save \$
- Spending time to save time
- Spending resources to save resources
- Examples
 - a stitch in time, an ounce of prevention, college education, roof repair, time with kids

InThinking

InThinking is about a transformation of the ways people think into effective predetermined patterns and sequences of thinking. The organization of thinking itself and the awareness that there is a choice of alternative ways of thinking when creating better solutions, presents a significant and exciting departure from traditional approaches.

InThinking & Enterprise Thinking

Increase individual awareness
on thinking (InThinking)

Evolve the way we behave

Evolve the way we
think together
(Enterprise Thinking)

Evolve the way we run
our organizations



Investment Opportunities



Thinking

The diagram features a light blue oval containing the word 'Thinking' in a dark blue, italicized serif font. A black line originates from the top of this oval, extends upwards and to the right, then turns downwards and to the right to connect to the top of a second oval. This second oval is also light blue and contains the word 'Technology' in a dark blue, bold sans-serif font. The background of the entire slide is a faded image of a chain-link fence. Behind the fence, a blue circular sign is visible with the text 'NO DUMPING' at the top and 'LOS ANGELES COUNTY' at the bottom. Below the sign, there is text that reads 'TO REPORT ILLEGAL DUMPING, CALL THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS 1-800-303-0003'.

Technology

What is needed ?

Thinking that
promotes
better
discovery



Prevailing System of Management

- Driving Change
- Reliance on Reforming
- Reducing Variation, Cost, Waste, Inventory, etc
- Talk about “Working Together”
- Striving for “Zero Defects” and “Zero Waste”
- Continuous Improvement
- Using Metrics for Alignment*

***without a thinking transformation**



Enterprise Thinking Organization

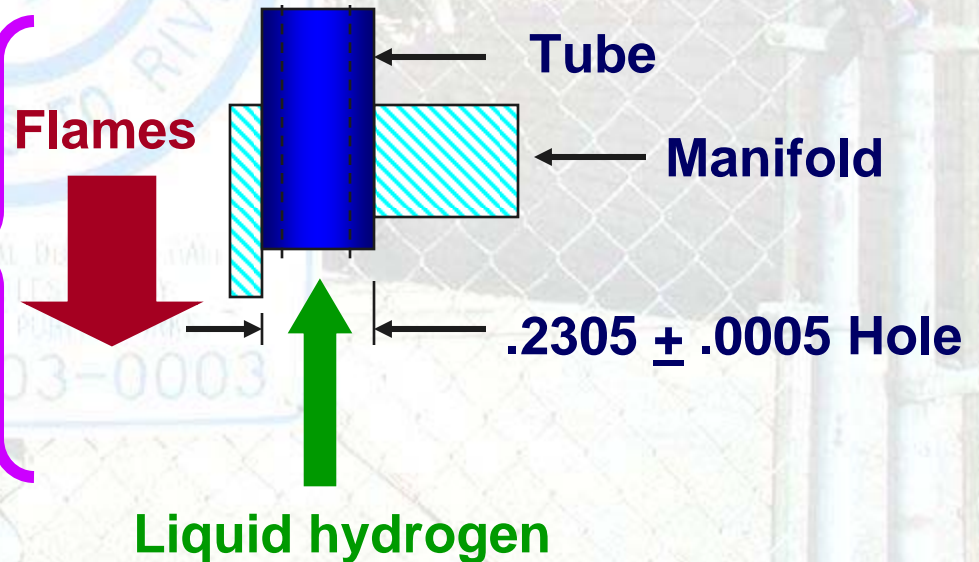
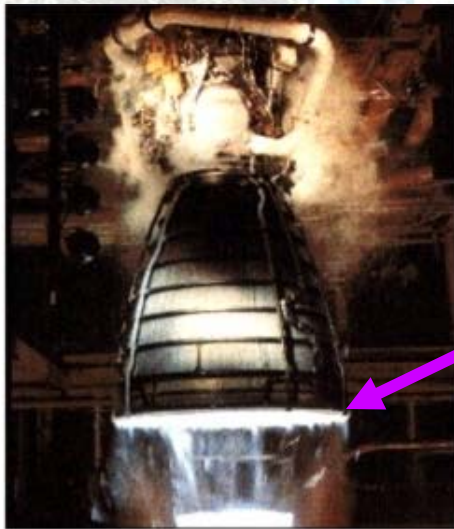
- Leading Transformation
- Use of Reformation and Transformation
- Resource & Relationship Management
(Striving for Balance)
- Thinking & Learning Together - Then
Working Together
- Continuous Investment
- Using Thinking for Alignment
 - InThinking and Enterprise Thinking

Better Value



Better Value – Tube Fit in Hole

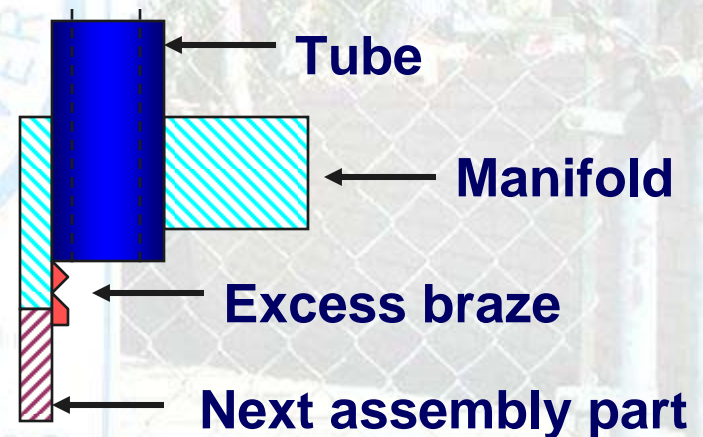
Consider a tube fit into a hole



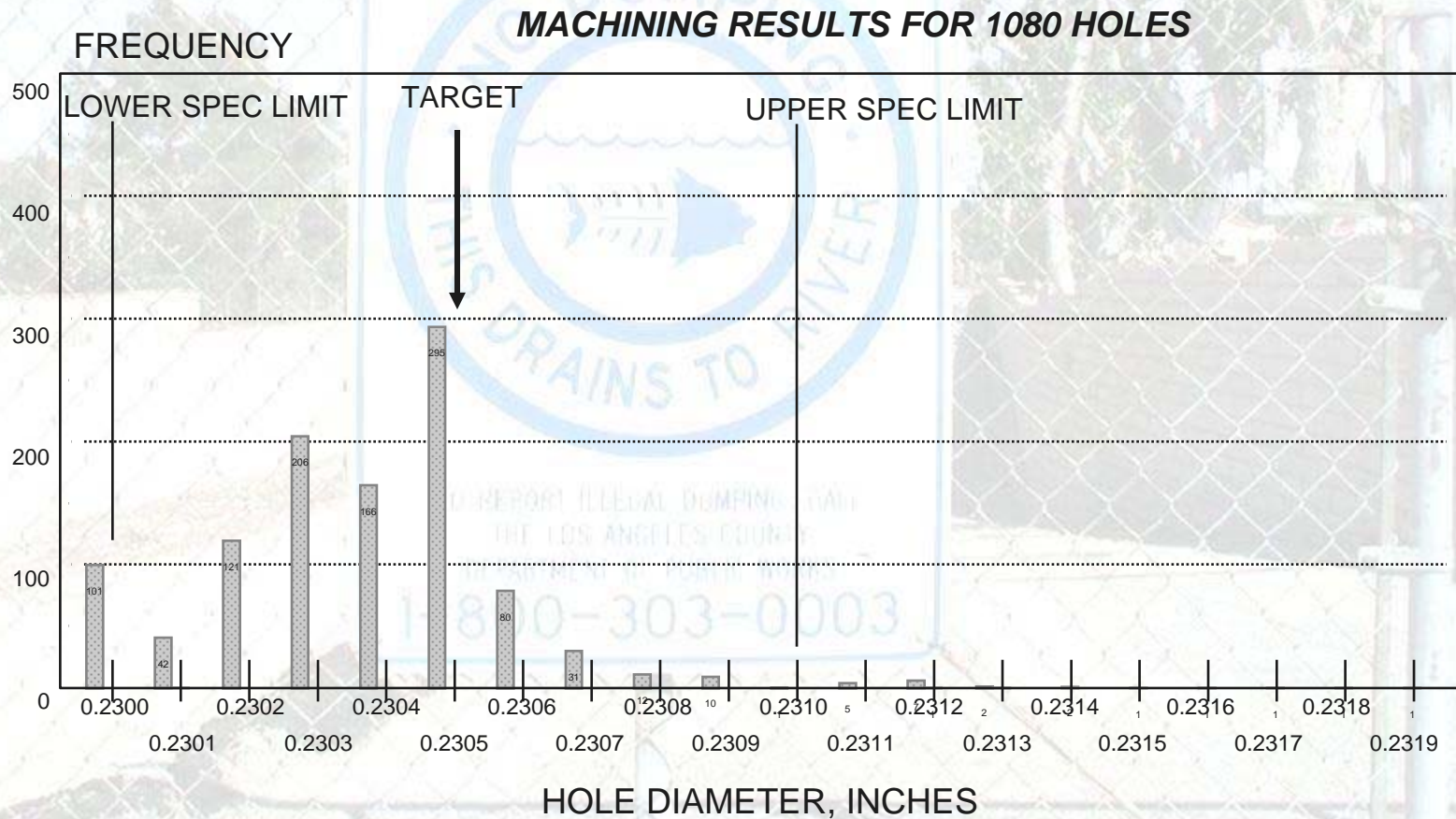
Better Value – Tube in Hole - Next Assembly

Traditional Approach

- Ream/ rework holes
- Braze flow thru holes
- Crack welds
- Add grind operation
- Add etch operation
- Add better etch operation

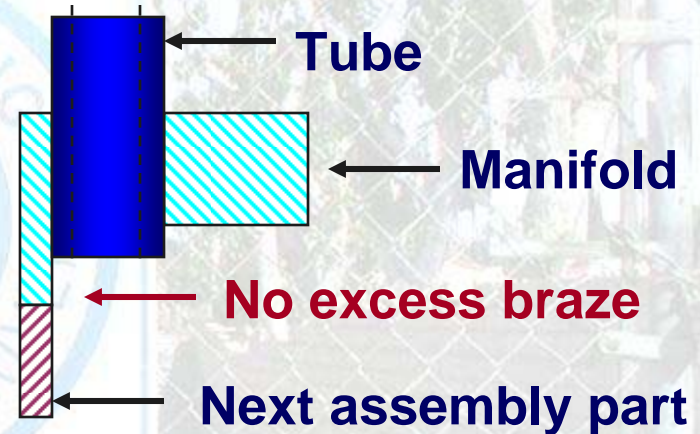


Better Value – Drilled Hole Data



Better Value – Tube in Hole - Next Assembly

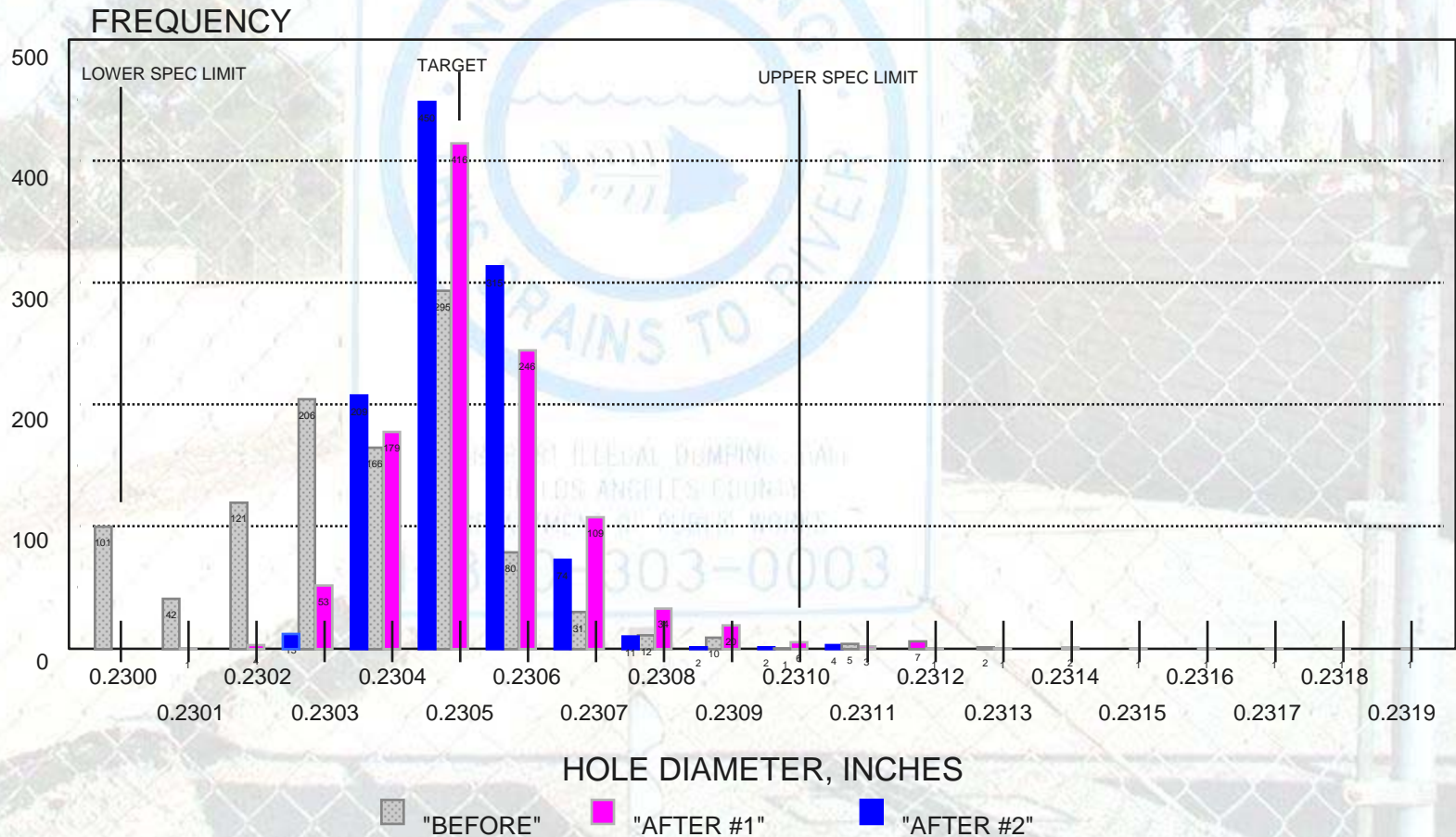
- **Traditional Approach**
- Ream/ rework holes
- Braze flow thru holes
- Crack welds
- Add grind operation
- Add etch operation
- Add better etch operation



- **Better Approach**
- Improve hole drilling
 - To target
 - Better distribution
- Successful first-cycle braze
- No excess braze

Better Value – Drilled Hole Data Post Taguchi Experiment

MACHINING RESULTS FOR 1080 HOLES - "BEFORE" & "AFTER"



Additional Examples of Better Thinking

- Alan Winlow at Marshalls (UK)
- Ray Anderson at Interface (US)
- John Elter at Xerox (US)

Alan Winlow



UK Brick – Where's the Crisis?

“The late 1980's and early 1990's were a time of crisis for the UK brick industry and for Yorkshire Brick Company. The market for our products dropped dramatically and the number of people employed in the industry fell from 14,000 to 8,000 within a short space of time. Luckily for Yorkshire Brick Company I did not rely on previous knowledge to tackle the problem of the Company's survival but introduced Dr Deming's 'Fourth Generation Management' concepts into the organisation.....”

UK Brick – Where's the Crisis?

The result of introducing systems thinking, understanding variation, the theory of knowledge and people principles – psychology was profound and the business outperformed the rest of the industry by a wide margin.....What I would like to consider is what Dr Deming, if he were alive today, would be paying attention to. I can only think that he would be seeking to focus his attention on what for man is the ultimate system – the system of life on Earth.”

Alan Winlow

Source: Reflections on Natural Systems, Alan Winlow, 2002 In2:IN Forum

Yorkshire Brick – Before



Restoration Begins

“In 1974 the UK government introduced a Health & Safety at Work Act. Under this Act I had to consider the risks to children swimming in ponds in the worked out quarries. The Act laid the responsibility for any accidents on the Company and to minimise risks we set about restoring the worked out land with domestic and commercial waste. This was a stroke of good fortune, for not only did the activity produce a significant income, but also in addition on the 5th of May 1981 we discovered the site was producing Landfill Gas – a source of energy for firing our products.....”

Restoration Begins

“Landfill Gas is a mixture of methane and carbon dioxide that is formed by the biodegrading of the organic fraction of the waste. We established that there were large commercial quantities available and by 1983 we had implemented a Landfill Gas recovery system that enabled us to use the gas as a substitute for natural gas in our kilns. The benefit to date is several million dollars and the emissions produced when the gas is burnt are less dangerous to the planet than if they were allowed to leak into the atmosphere.”

Source: Reflections on Natural Systems, Alan Winlow, 2002 In2:IN Forum

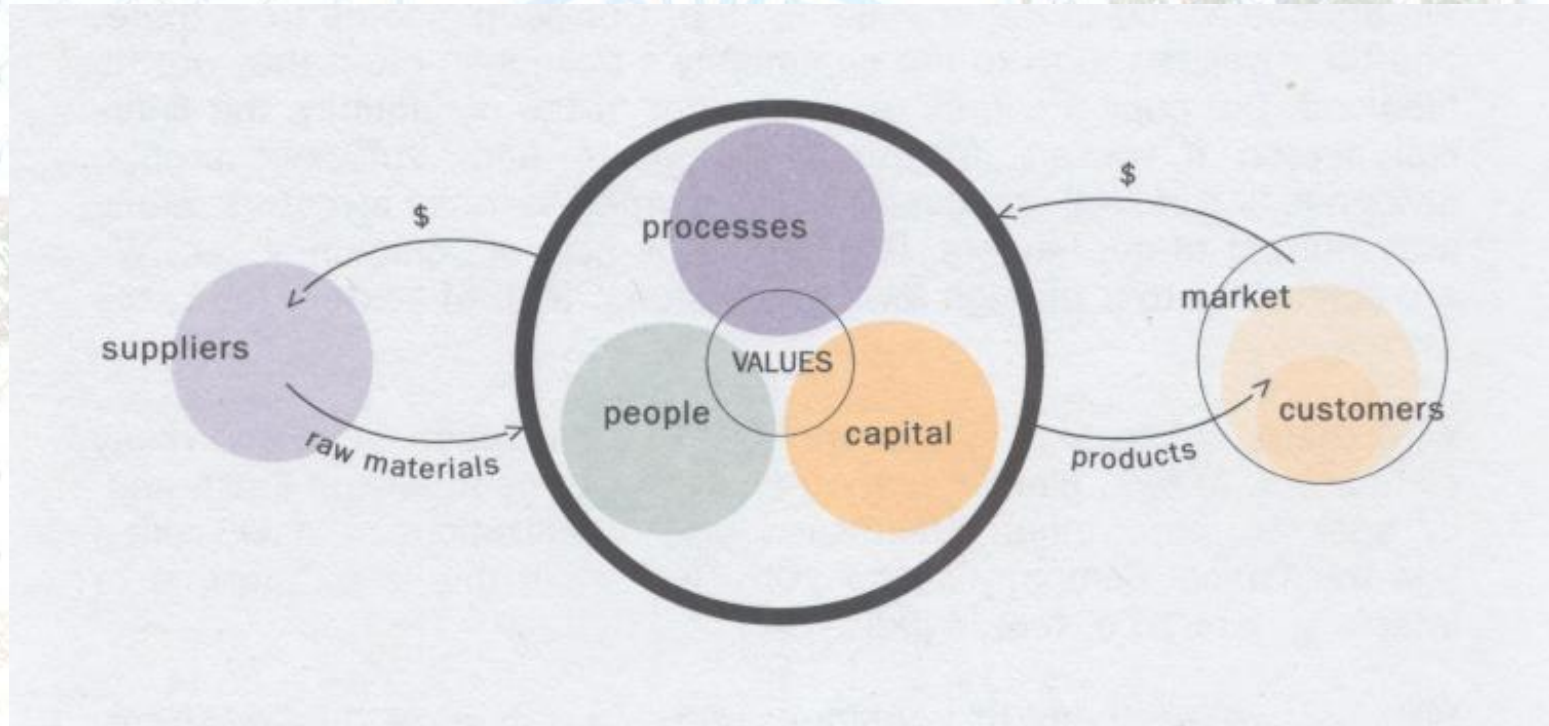
Yorkshire Brick – After



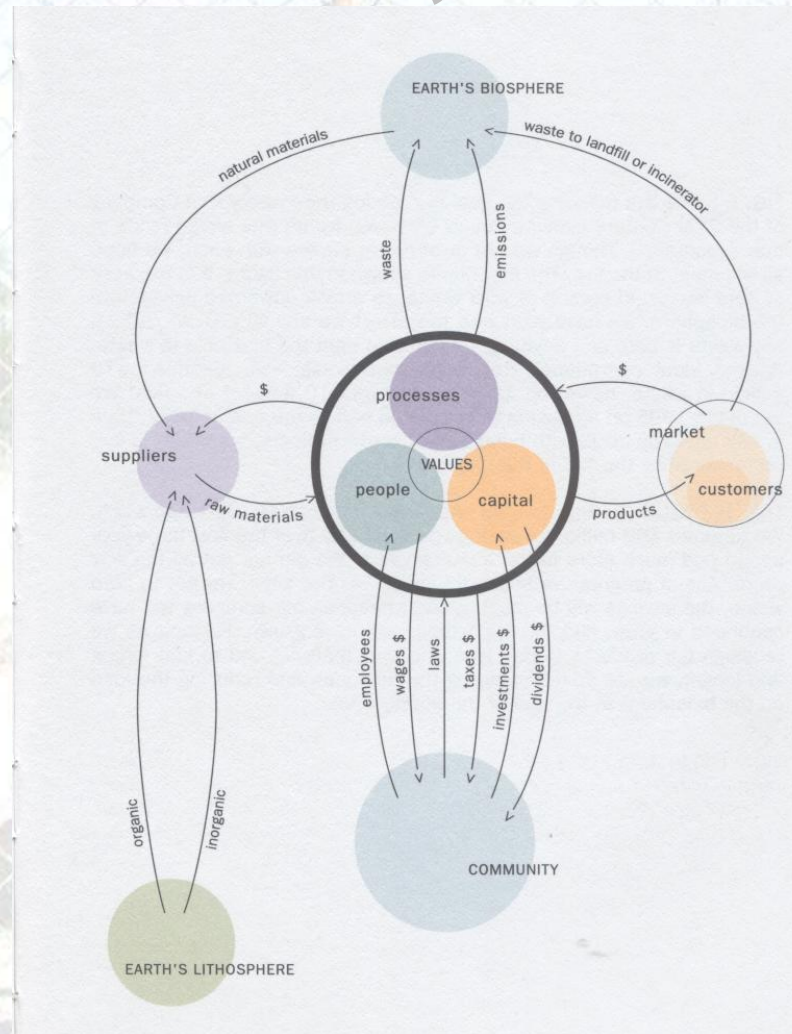
Alan Winlow, MBE



Ray Anderson, Interface



Ray Anderson, Interface



John Elter, Xerox

Reshaping of corporations to be addressed in F&ES talk John Elter, vice president of systems research and architecture at Plug Power, a fuel cell company, will give a talk on Monday, April 12. In his lecture, titled "Reshaping Corporations: Adding Value Through Responsible Business Practices," Elter will discuss the LAKES program, an award-winning 7-year, \$450 million effort to develop a new platform for photocopiers.

Source: www.yale.edu/opa/v32.n25/visiting.html

Imagine the Possibilities...

- when operating in an “Enterprise Thinking” environment
- if we could develop a broader appreciation of “continuous and connected learning”
- if we could develop a deeper appreciation of “*working together*”, “*learning together*” and “*thinking together*”

Imagine the Possibilities...

- and the markets we could create

Working Together

Investing Together

Designing Together

Building Together

Learning Together

Thinking Together

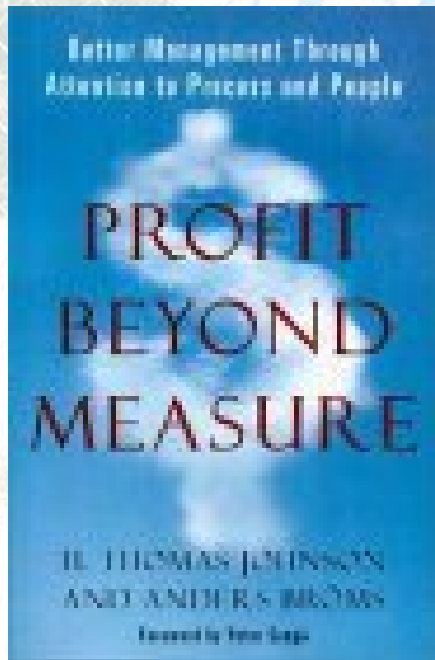
Leading Together

Edward de Bono on Quality

“The quality of our thinking will determine the quality of our future.”

Edward de Bono

Profit Beyond Measure



*This book is dedicated
to the memory of
Dr. W. Edwards Deming
1900-1993*

*May the
Seventh Generation
after us know a
world shaped by
his thinking*