

If Assembly is Required, Mind the Gap, Not the Part

Presented by Dr. Bill Bellows

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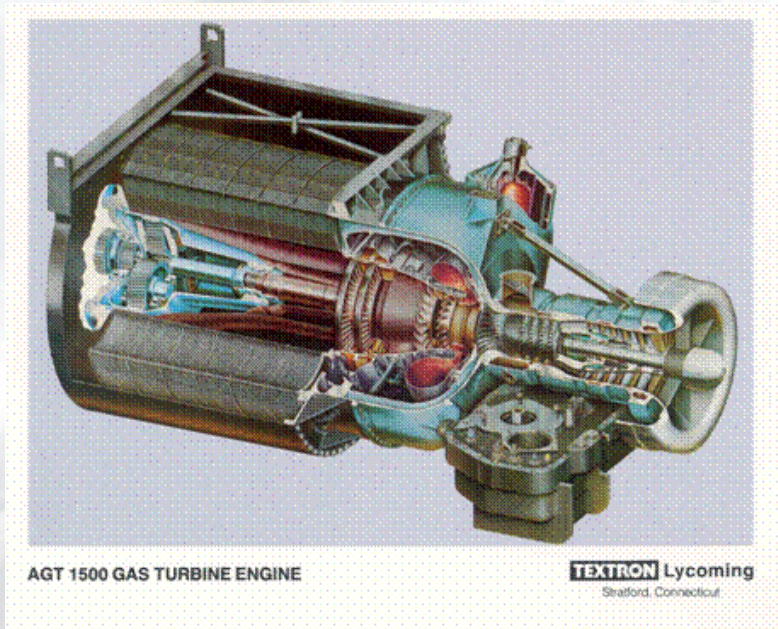
Abstract: In the late 1960's, Frank Pipp, an assembly plant manager for an American automobile company, instructed his team to purchase competitor's cars. His plan was to have the final assembly team disassemble these cars and learn first-hand how they assembled. At that time, if two connecting parts could be assembled in Pipp's plant without the use of a handy rubber mallet, then these parts were known as "snap fit". In Pipp's experience, snap-fit was a rare occurrence. To his amazement, one competitor's car was discovered to be 100% "snap fit", for which his division GM replied, "The customer will never notice."

Slowly, but surely, customers have noticed the assembly and performance results that Pipp's team found in 1969, when they first examined a Toyota pickup truck. Fast forward to 2013, when the assembly and performance advantages of 100% snap-fit hardware have been demonstrated and replicated within Rocketdyne for over 15 years. They do so with an emphasis on "better thinking about thinking," which shifts attention from a traditional focus on parts to the gap between the parts and, thereby, how parts integrate. In his overview presentation, Bill will provide a revealing explanation of how Rocketdyne has achieved this success, using ideas that stretch far beyond the traditional Lean and Six Sigma Quality approaches.

Agenda

- *Background*
- *Quiz*
- *Macro Systems – Mind the Part*
- *Micro Systems – Mind the Gap*
- *Modes of Thinking*
- *Purposeful Resource Management*

Tank Engines and Rocket Engines



AGT1500



RS68

Investing in Technological Solutions

“One of the world’s largest companies, an organization once regarded as the model for business everywhere, gave an indication last week that it’s getting its act together again. GM reported good profits and a confident outlook.....The emerging image is of a savvier, leaner GM that nonetheless recovered without savage downsizing...Nor did GM go in for whiz-bang new technology as it tried to do in the 1980’s ...”

Investing in Technological Solutions

“...when it first responded to inroads by Toyota and other Japanese car makers. At that time, GM had \$10 billion in spare cash, which it proclaimed would buy the world’s most technologically advanced production system... Competitors were not impressed. “I don’t care how much money they have,” the head of Honda said at the time. “Unless GM changes its management system, it will not succeed.”

If Assembly is Required...

“I vividly recall an anecdote Frank Pipp told me that occurred while he was running a Ford assembly plant in the late 1960's....

At that time, Ford, along with the other American automakers, didn't believe that you could assemble a car without a rubber mallet handy to bang together the parts that didn't quite fit right. The rest of the parts.....were known as snap-fit parts.”

If Assembly is Required...

“When Pipp’s crew got done taking apart and reassembling the Toyota truck, they were speechless. They hadn’t once needed to pick up a mallet. The truck was entirely snap-fit. They had never seen anything like it.”

Resource Management

A
c
t
i
v
i
t
y

Proactive

Reactive



"Mine"

"Ours"

Ownership

Resource Management

**Proactive – applying effort while
“good,” “OK,” “well,” or “correct” is
happening**

**Reactive – applying effort after
“bad,” “not OK,” “sick,” or
“incorrect” happens**

Resource Management

“An ounce of prevention is worth a pound of cure.”

“A stitch in time saves nine.”

“Every dollar we invest in high-quality early education can save more than \$7 later on.”

Macro System Model

(Part Work)

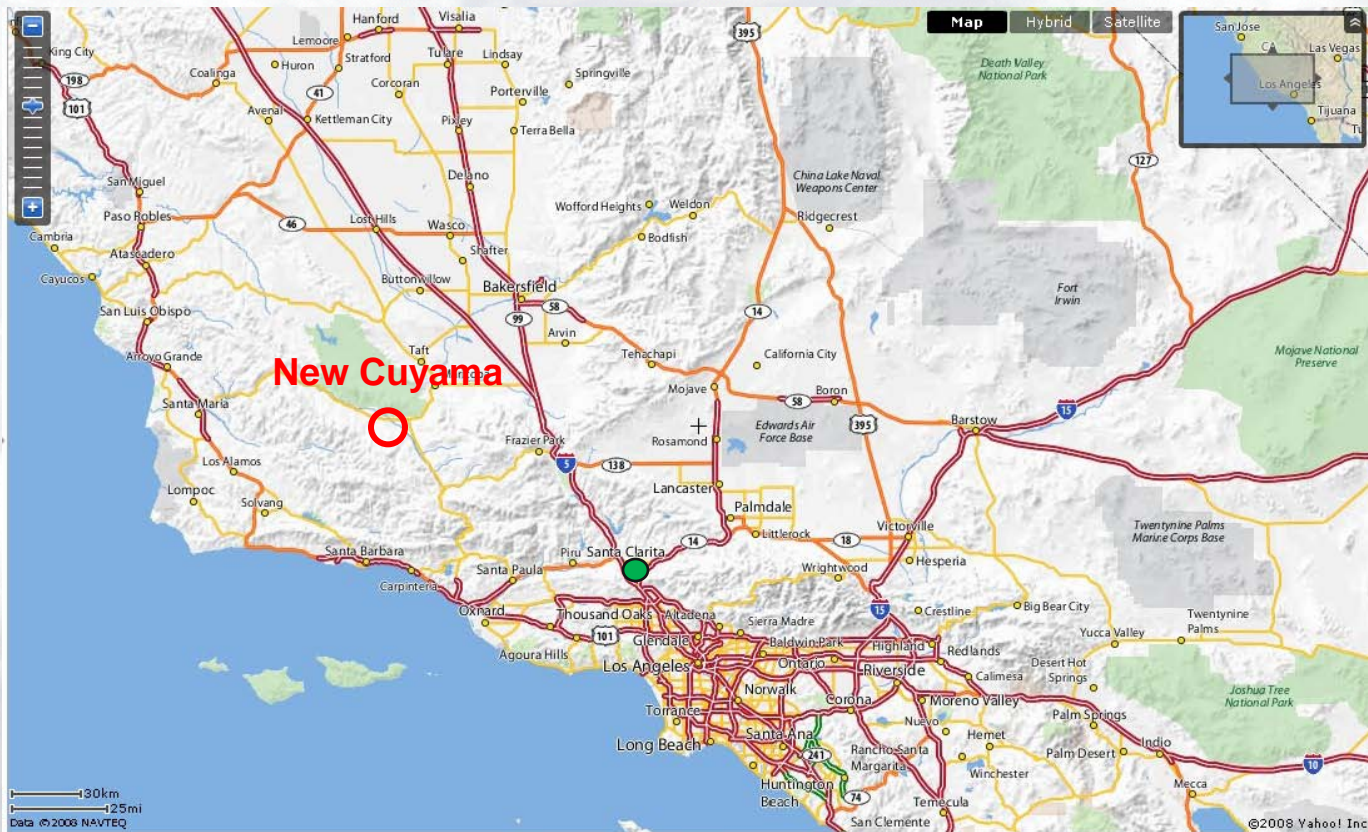
- Quality Focus: Conformance to Requirements
- Goal: Defect-Free Parts
- Activities: Assess Non-Conformances, Scrap and Rework
- Mindset: Reactive / Victim
- Skills: Fire-Fighting and Problem Solving
- Impact: No Improvement in Quality After Zero Defects, Temporary Solutions
- Attributes: Physical and Mental Handoffs (separation, blame)

Perception & Thinking

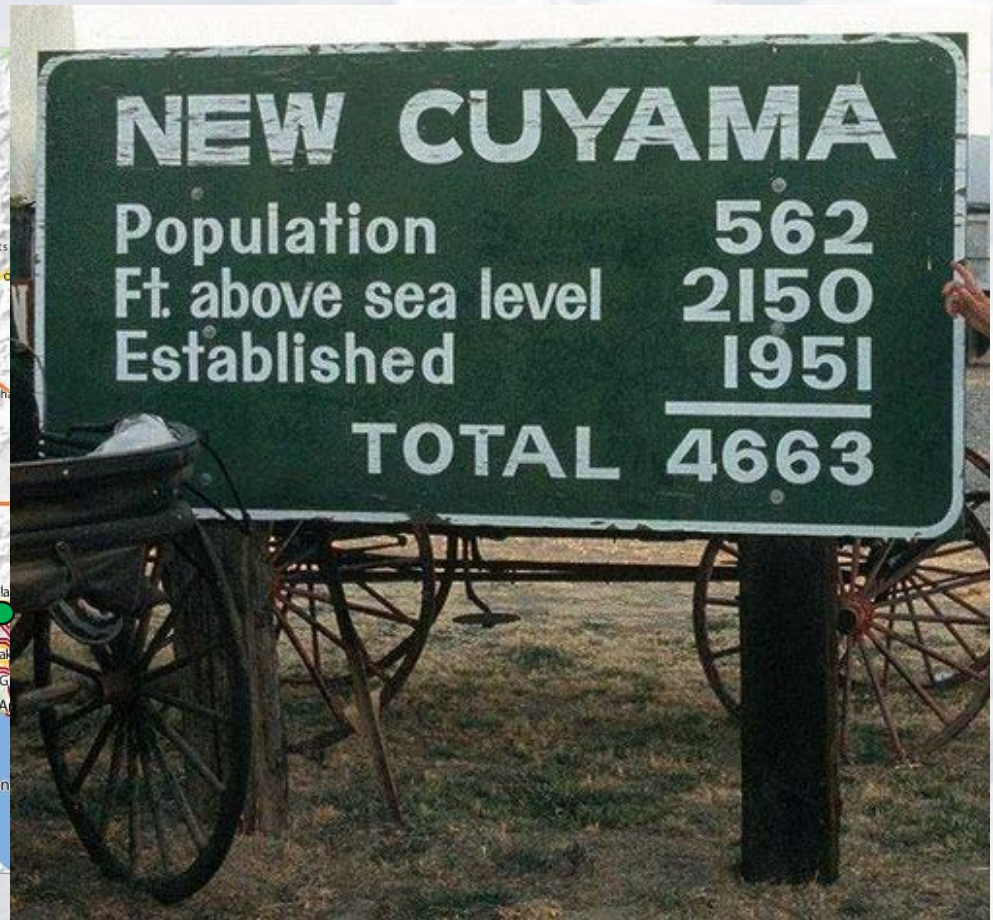
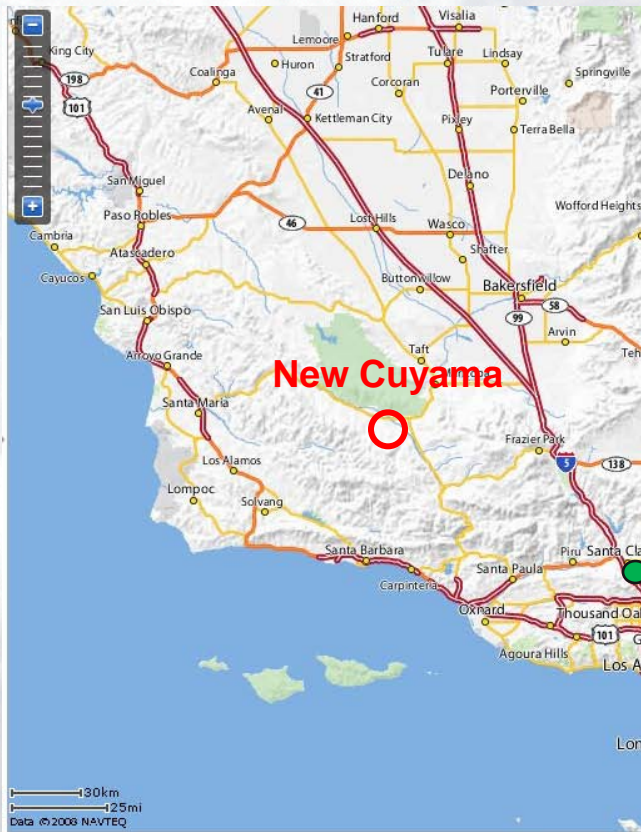
“What we see depends on what we thought before we looked.”

Myron Tribus

New Cuyama, California



New Cuyama, California



Quiz

Alligators

What is the leading use of alligator skin in the United States today?

Alligator Skin



Addition

1000

40

1000

30

1000

20

1000

10

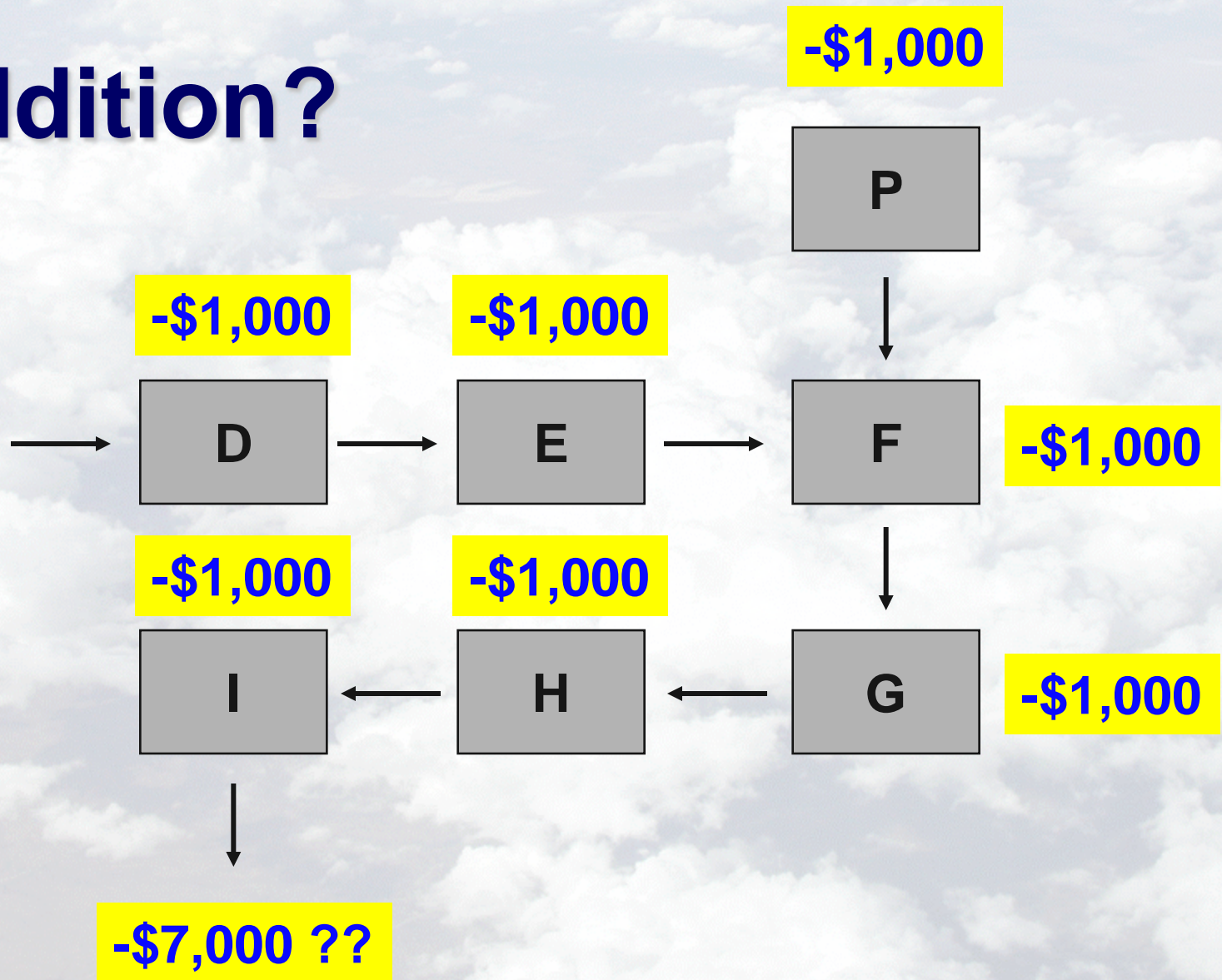
Addition

$$1 + 1 = 2$$

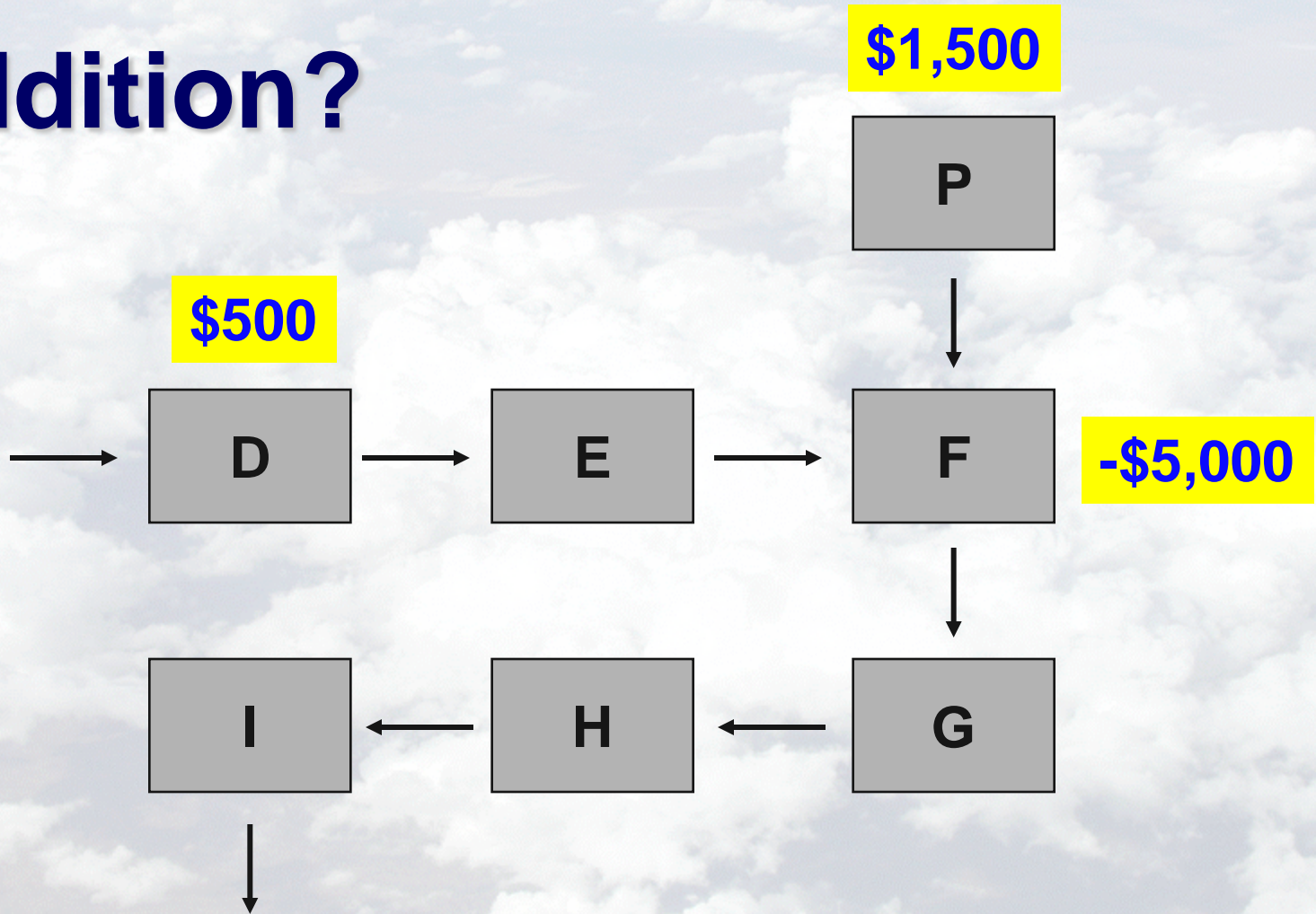
Addition



Addition?



Addition?



Addition

“You think because you understand one you must understand two, because one and one makes two. But you must also understand and.”

Donella Meadows

Time Management

How much time is spent discussing parts which are good and arrive on time?

How much time is spent studying for the final exam, questions from weekly quizzes and the mid-term which were correct?

Time Management

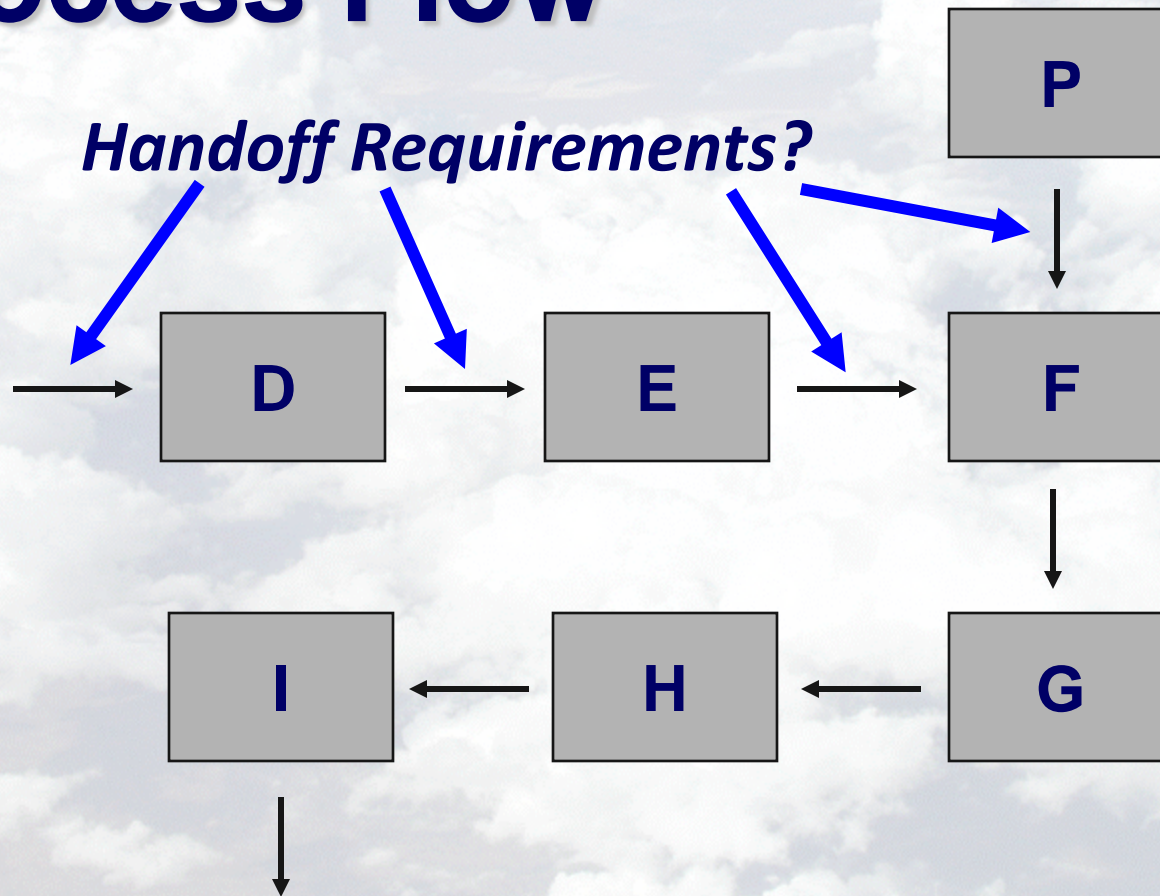


Grades

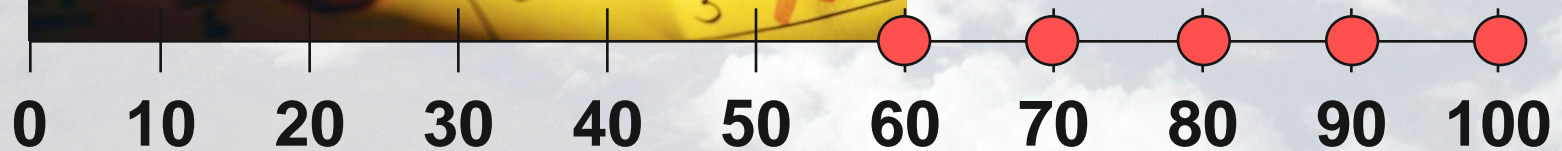
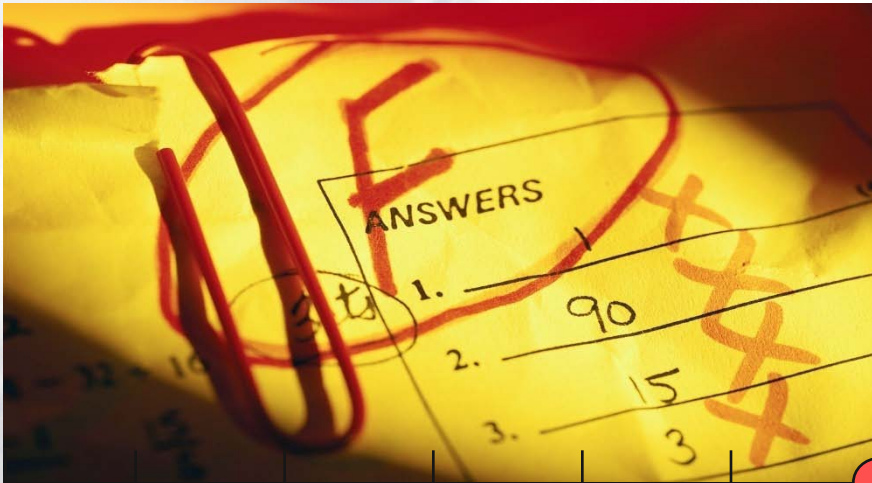
What letter grade is required for all parts purchased?



Process Flow



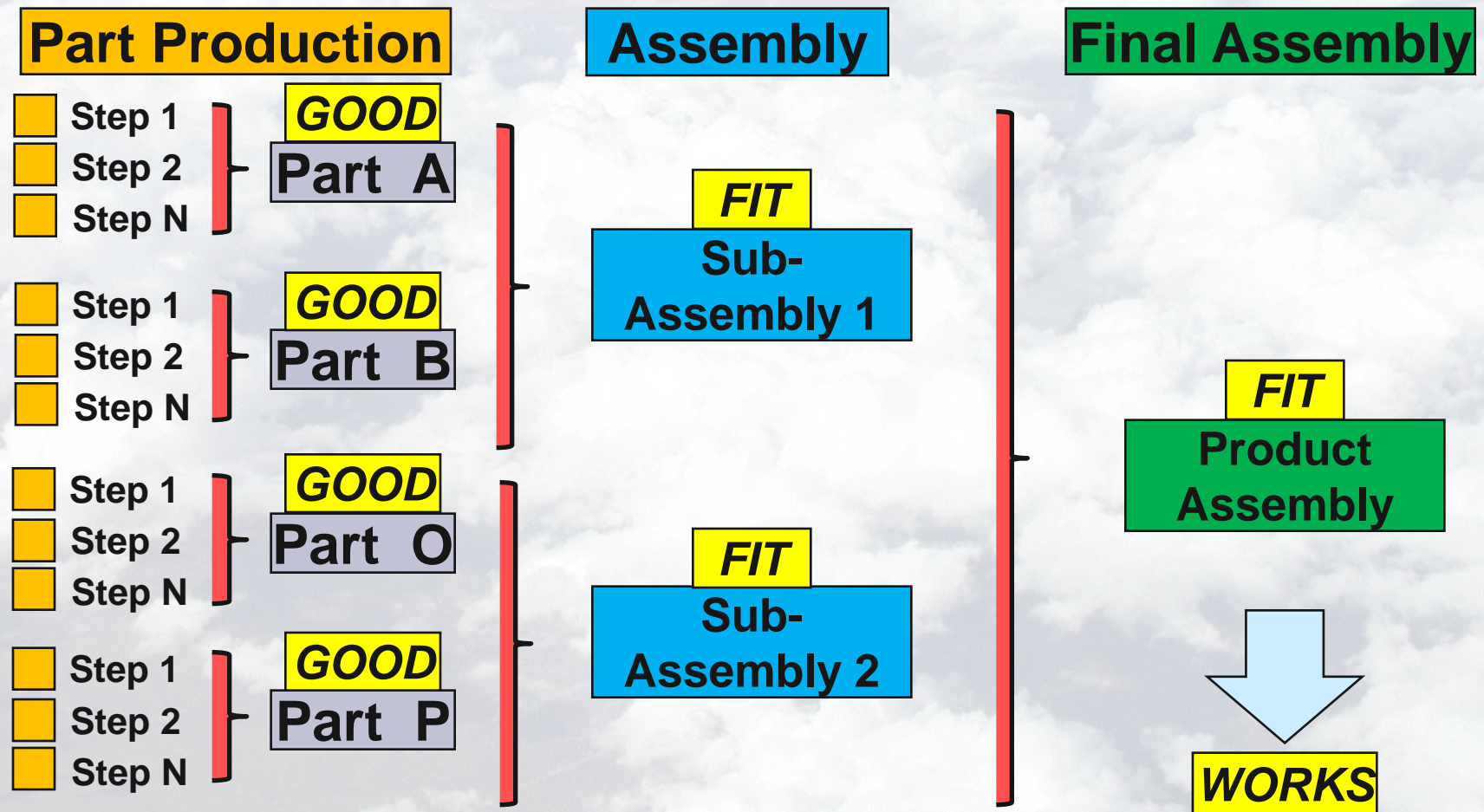
Grades





Macro Systems – ***Mind the Part***

Macro System Model

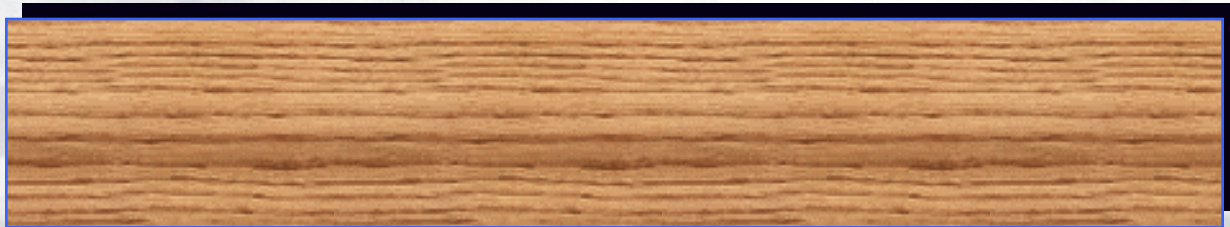




Micro Systems – ***Mind the Gap***

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



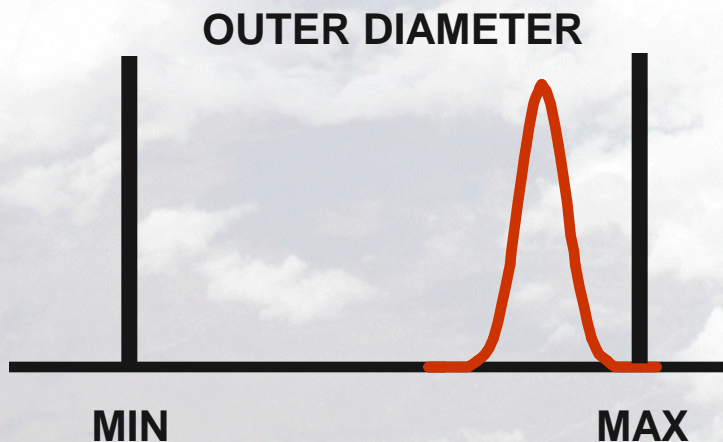
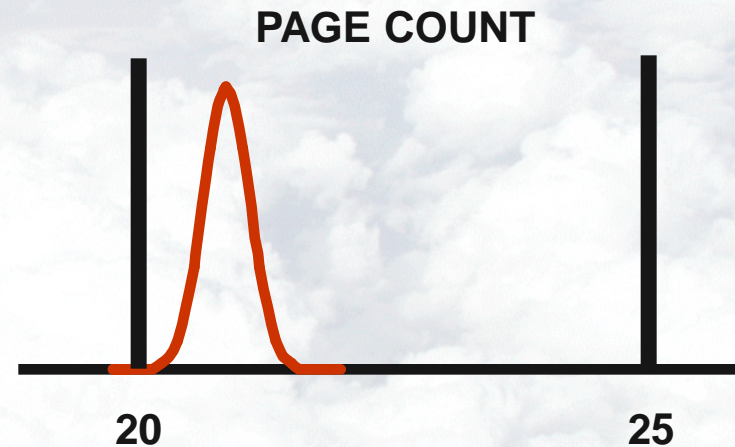
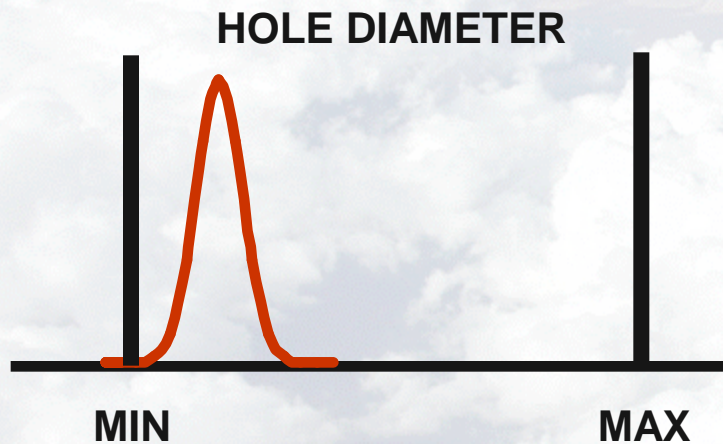
Cutting Wood

2 lines

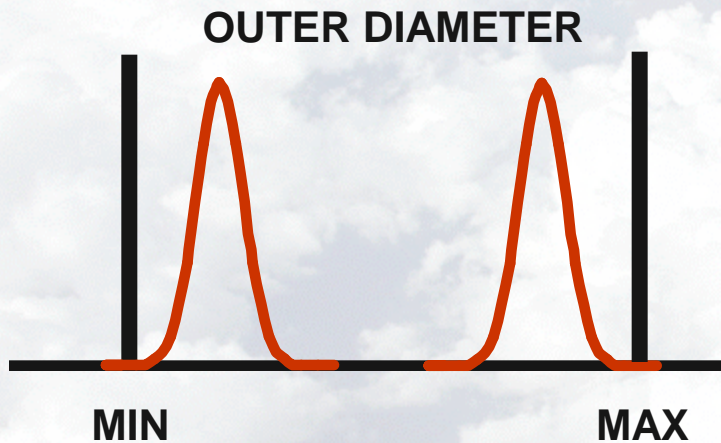


target

Examples of Process Management



Examples of Process Management

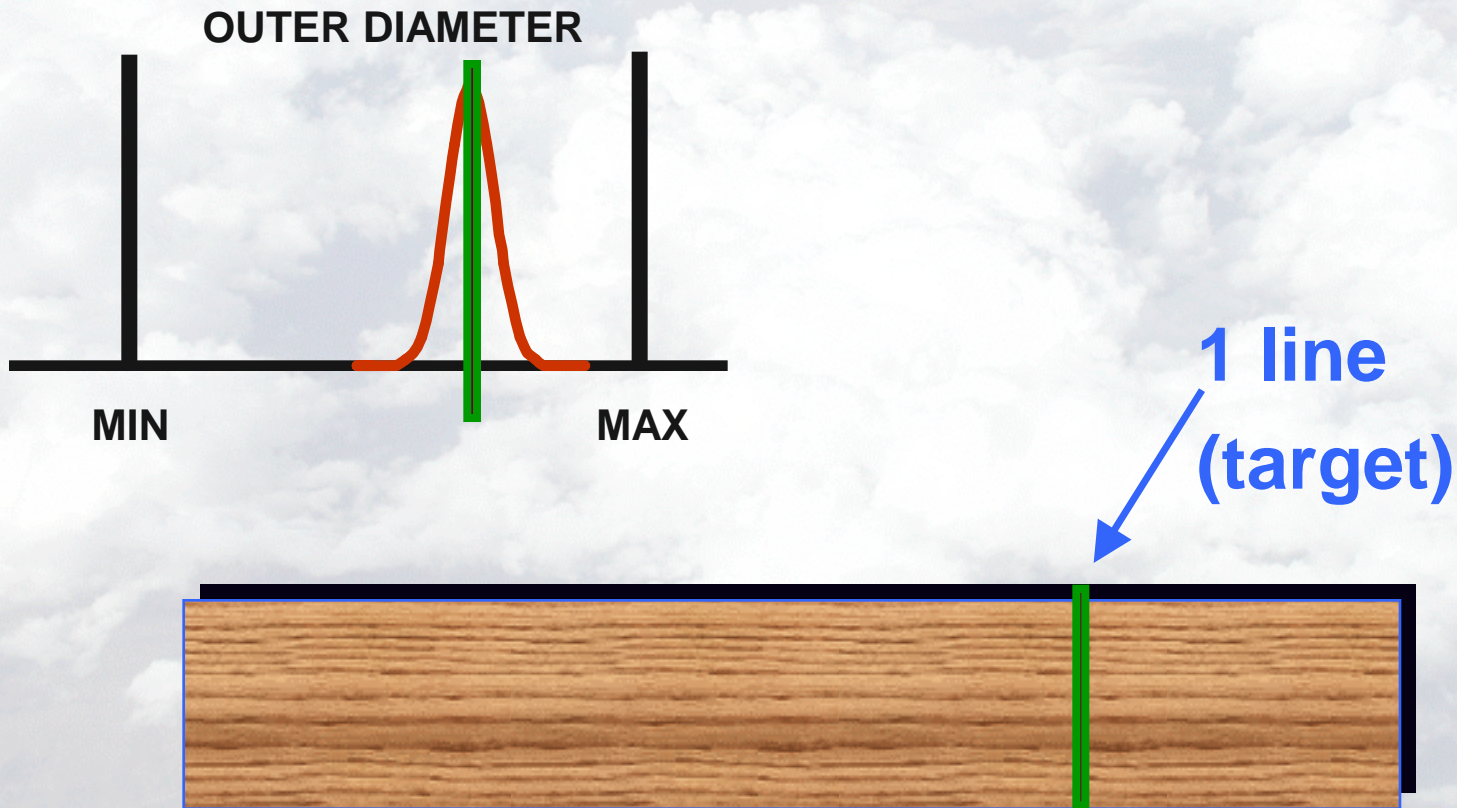


2 lines

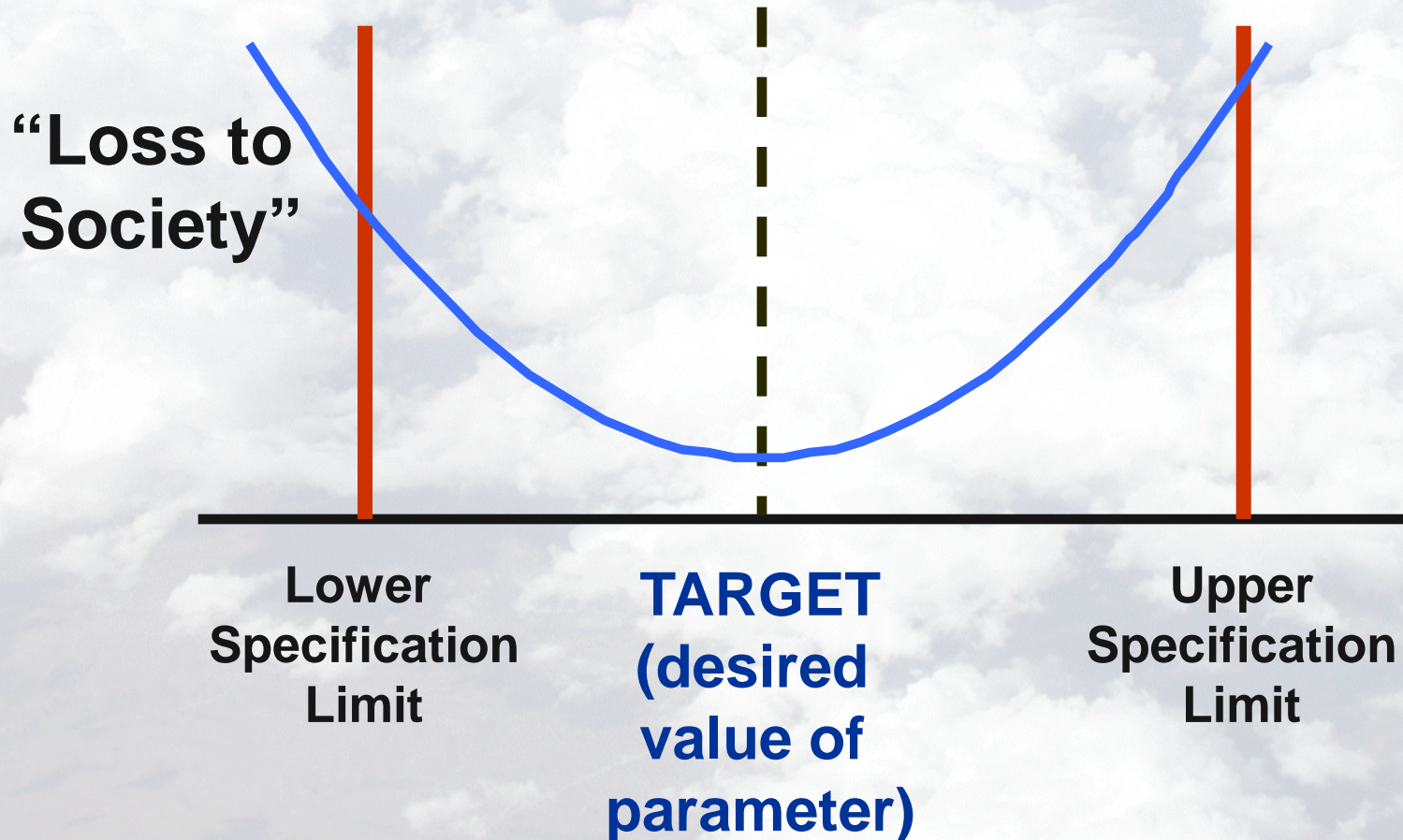


target

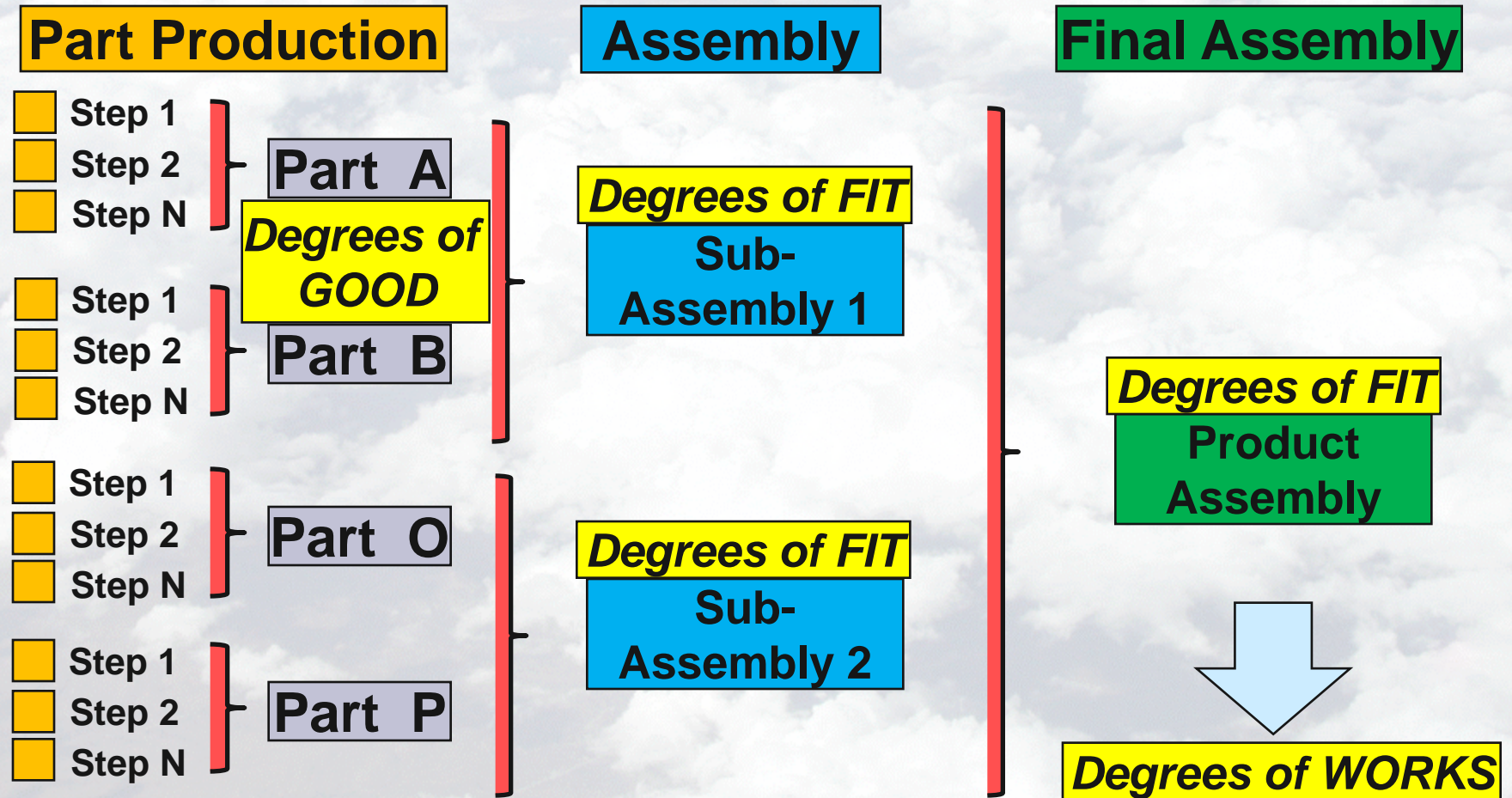
Examples of Process Management



Taguchi's Quality Loss Function



Micro System Model



Macro System Model (Part Work)

- Quality Focus: Conformance to Requirements
- Goal: Defect-Free Parts
- Activities: Assess Non-Conformances, Scrap and Rework
- Mindset: Reactive / Victim
- Skills: Fire-Fighting and Problem Solving
- Impact: No Improvement in Quality After Zero Defects, Temporary Solutions
- Attributes: Physical and Mental Handoffs (separation, blame)

Micro System Model (Team Work)

- Quality Focus: Relationships Between Parts (*Target Thinking*)
- Goal: Profit Beyond Measure
- Activity: Seeking Opportunities to Invest in Better Relationships between Parts
- Mindset: Proactive / Leader
- Skills: Process Control and Systemic Solutions
- Impact: Continuous Investment in Quality of Relationships, Long-Lasting Solutions
- Attributes: Physical Handoffs, without Mental Handoffs (no separation nor blame)

Macro System Model (Part Work)

- Quality Focus: Conformance to Requirements

Goal: Defect Free Parts



Quality After Zero Defects,
Temporary Solutions

- Attributes: Physical and Mental Handoffs (separation, blame)

Micro System Model (Team Work)

- Quality Focus: Relationships Between Parts (*Target Thinking*)

Goal: Profit Driven Measure



Quality of Relationships, Long-
Lasting Solutions

- Attributes: Physical Handoffs, without Mental Handoffs (no separation nor blame)



Modes of Thinking

Modes of Thinking

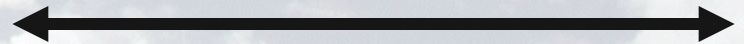
➤ Categories

- Absolutes
- Discrete / Digital
- How many students/faculty?



➤ Continuum

- Relative
- Wholeness / Analog
- Students and Faculty are different
- Better/Faster/Cheaper/Smarter/etc.



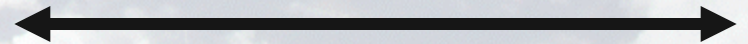
Modes of Thinking

➤ Categories

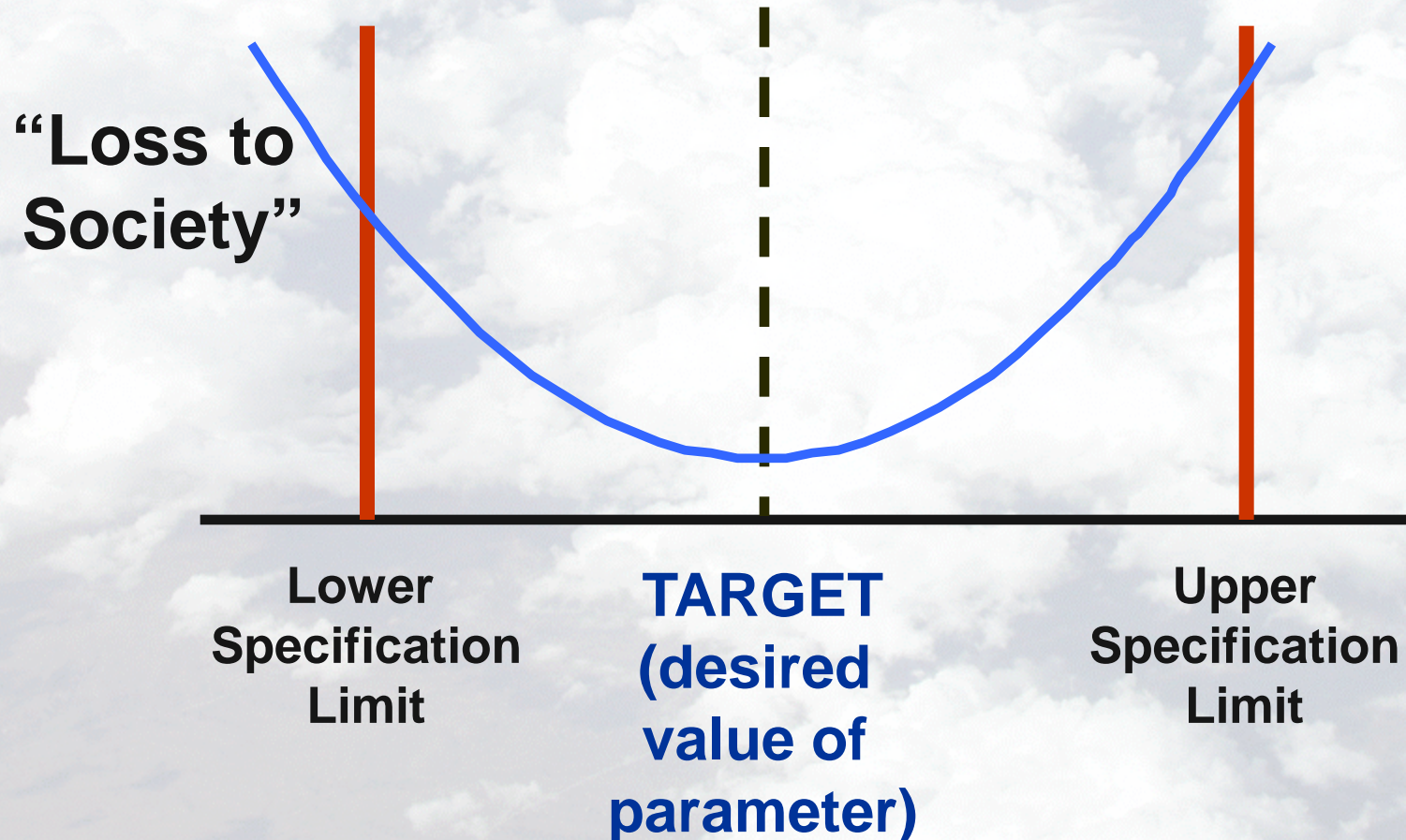
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➤ Continuum

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Taguchi's Quality Loss Function



Perception & Thinking

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

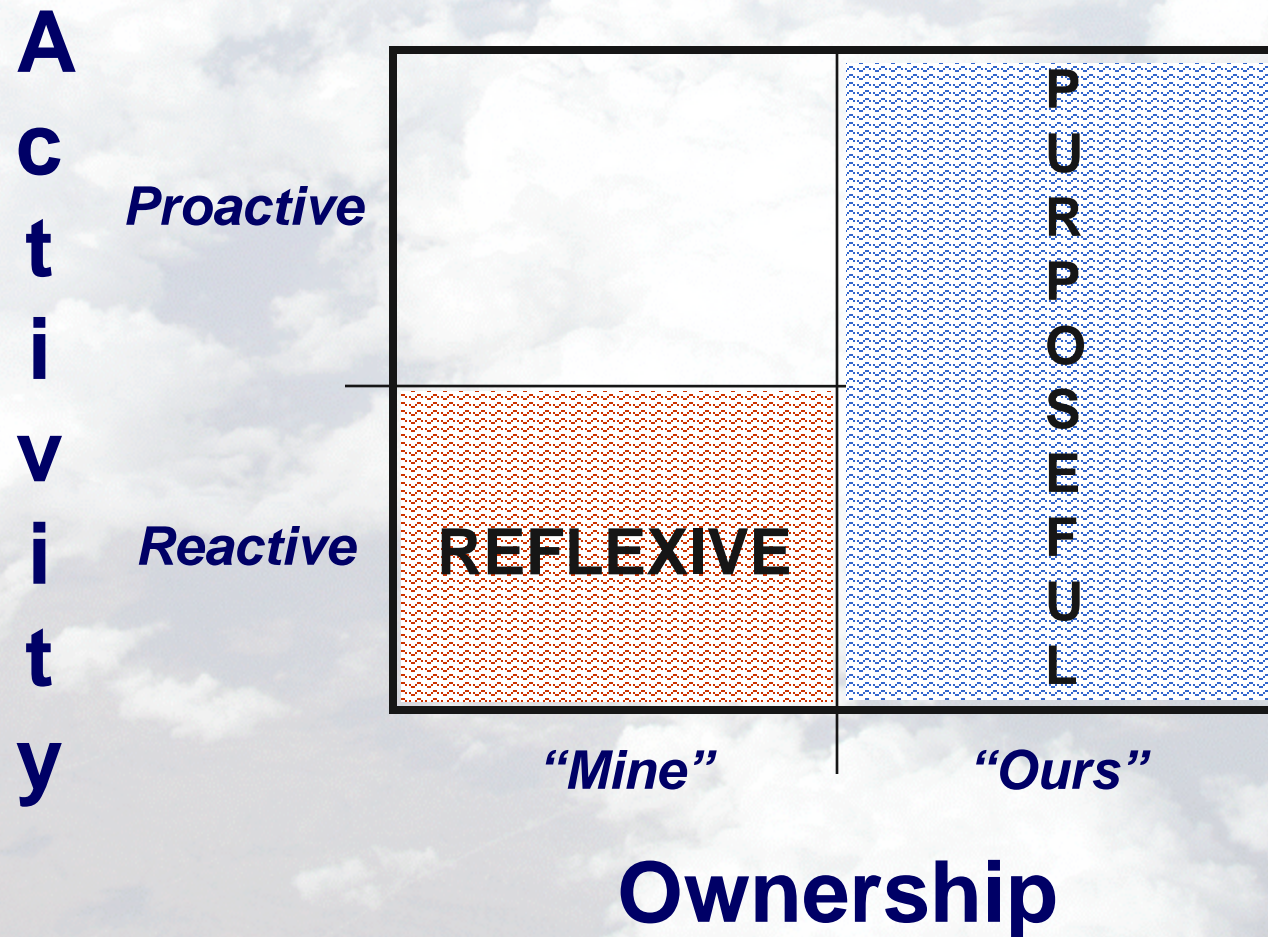
The world we perceive is a world we bring forth through our thinking.”

H. Thomas Johnson



Purposeful Resource Management

Resource Management

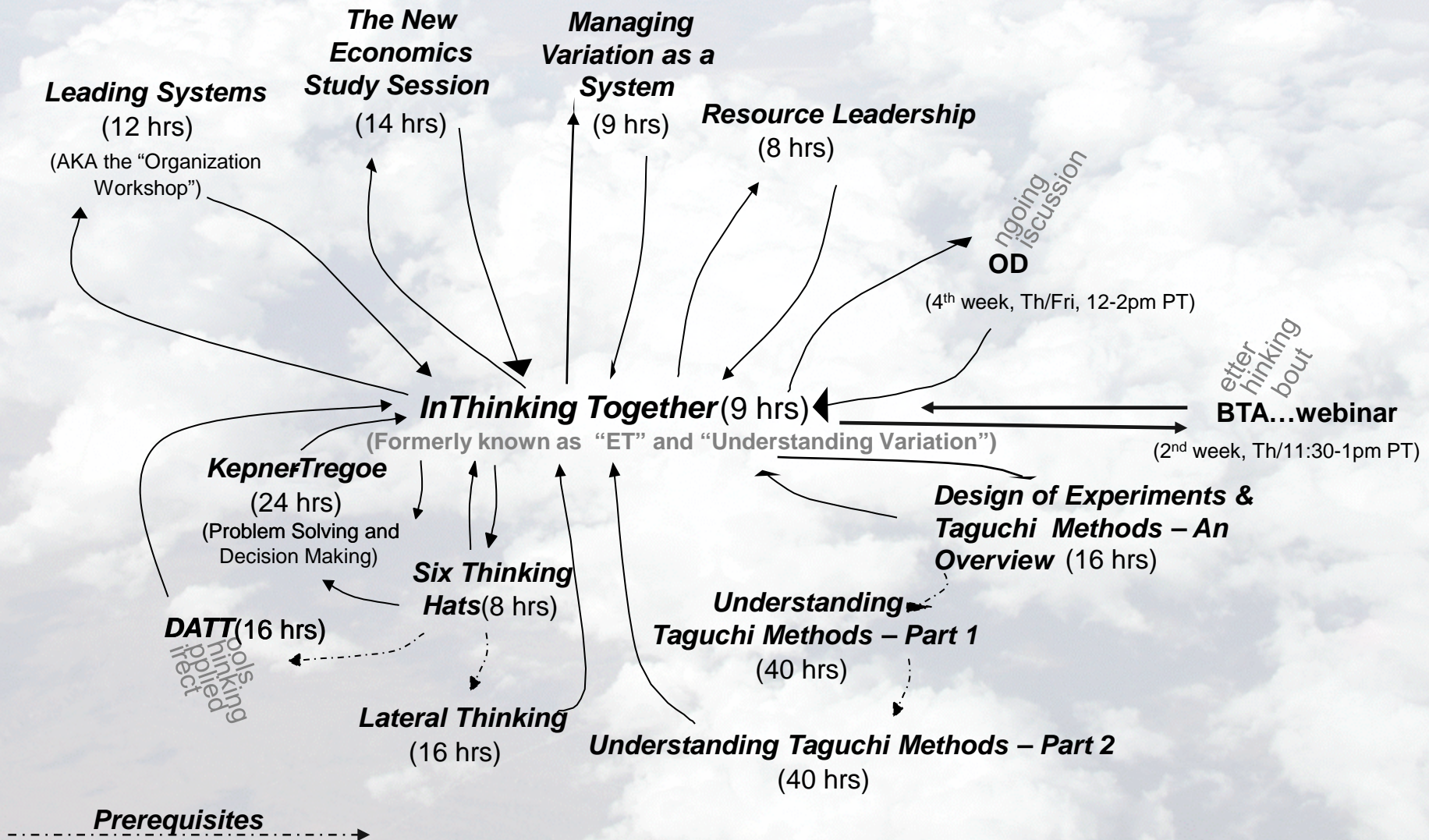




An InThinking Roadmap

An InThinking Roadmap

AKA The Hotel California



An InThinking Roadmap

TARGET AUDIENCES: Members of management, individual contributors, suppliers, and customers who are providing leadership in "enterprise thinking" activities. Family members, "members of the community" and students are welcome to attend. "Members of the community" are citizens who are involved full or part time, or in a volunteer capacity, in community related work. Examples include hospital employees, teachers, religious leaders, scouting leaders, and youth sports volunteers.

In2:InThinking Network 2013 Forum

The Art of Reflection: Connect – Inspire - Act

June19– 23, 2013 in Los Angeles, California

The In2:InThinking Network was formed in 2001 by a group of students of the work of W. Edwards Deming and related theorists, including Russell Ackoff, Edward de Bono, Tom Johnson, Peter Senge, and Genichi Taguchi. The aim of our network is to make thinking about sub-systems, variation, knowledge, and psychology, and their interaction – which comprises Deming's System of Profound Knowledge - more conscious. We believe that such thinking about thinking, which we call “InThinking,” will allow people to better perceive relationships and interdependencies in human endeavors, and consequently act to make those endeavors more valuable, more satisfying, and more joyful. The aim of our 5-day In2:IN 2013 Forum is to continue to elevate the consciousness of individual and collective thinking. Join us in learning, connecting, and improving how we can *work, learn, and think* together. Registration fee: \$400, with a \$50 discount for registering on or before May 8th.



Learn more about our 2013 Forum at our website at www.in2in.org

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