Identifying and Calculating the Cost of Poor Quality
WHO WILL GIVE ME.....
Poor Quality Loss & Inefficiency: Percentage of Operating Budget

WE DON’T LOSE MONEY DOING WORK RIGHT
Our Target Should Be…

THROUGH GOOD QUALITY MANAGEMENT

WE DON’T LOSE MONEY DOING WORK RIGHT

97% OPERATING BUDGET

3% LOSS

VS.

95% OPERATING BUDGET

5% LOSS
<table>
<thead>
<tr>
<th>Operating Budget</th>
<th>40% Loss</th>
<th>25% Loss</th>
<th>10% Loss</th>
<th>5% Loss</th>
<th>3% Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1k</td>
<td>$400</td>
<td>$250</td>
<td>$100</td>
<td>$50</td>
<td>$30</td>
</tr>
<tr>
<td>$5k</td>
<td>$2000</td>
<td>$1250</td>
<td>$1500</td>
<td>$250</td>
<td>$150</td>
</tr>
<tr>
<td>$25k</td>
<td>$10,000</td>
<td>$6,250</td>
<td>$2500</td>
<td>$1,250</td>
<td>$750</td>
</tr>
<tr>
<td>$50K</td>
<td>$20,000</td>
<td>$12,500</td>
<td>$5000</td>
<td>$2,500</td>
<td>$1,500</td>
</tr>
<tr>
<td>$100K</td>
<td>$40,000</td>
<td>$25,000</td>
<td>$10,000</td>
<td>$5,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>$200K</td>
<td>$80,000</td>
<td>$50,000</td>
<td>$20,000</td>
<td>$10,000</td>
<td>$6,000</td>
</tr>
<tr>
<td>$500K</td>
<td>$200,000</td>
<td>$125,000</td>
<td>$50,000</td>
<td>$25,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>$1 million</td>
<td>$400,000</td>
<td>$250,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$30,000</td>
</tr>
</tbody>
</table>
What Does A Hamburger Cost?
What does a gallon of regular gas cost?
What does a tube of latex caulk cost?
What does a bucket of mastic cost?
What does it cost to go back and fix attic hatch weather-stripping done wrong?
If profit is reduced, sales and delivery must increase.

If our competition has a lower price, what is the common way many compete?
If the cost of poor quality, inefficiency, and ineffectiveness are reduced, profit increases.
## The Cost of Doing Business

Costs are based on a 5 day-8 hour work schedule (=1260 work days per year)

### Labor Cost

<table>
<thead>
<tr>
<th>Labor Cost</th>
<th>Cost per Year</th>
<th>Cost per Day</th>
<th>Cost per Hour</th>
<th>Cost per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor – Management</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Labor – Office</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Labor – Sales</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Labor – Crew leader/Super</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Labor – Crew member</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Labor – Crew member</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Payroll taxes (Avg 14%)</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Labor</strong></td>
<td><strong>$</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

### Fixed/Variable Cost

<table>
<thead>
<tr>
<th>Fixed/Variable Cost</th>
<th>Cost per Year</th>
<th>Cost per Day</th>
<th>Cost per Hour</th>
<th>Cost per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Rent or Mortgage</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Truck Maintenance</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Truck Insurance</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gas</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tools and Equipment</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tool Maintenance</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Office Supplies/Software</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Computer Repairs</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Accounting</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Licensing, Bond and Certificates</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Workers Comp Insurance</td>
<td>$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Overhead</strong></td>
<td><strong>$</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Total Company Cost</strong></td>
<td><strong>$</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

*Copyright © 2016 Advanced Energy*
### Step 2: The Cost of Poor Quality

#### Individual Incidents

<table>
<thead>
<tr>
<th>Problem or Defect</th>
<th>Issues Associated with the Problem or Defect</th>
<th>Cost of the Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket seal along the attic hatch</td>
<td>Rework</td>
<td>$75.00</td>
</tr>
<tr>
<td></td>
<td>Extra Material</td>
<td>$20.00</td>
</tr>
<tr>
<td></td>
<td>Lost Production</td>
<td>$150.00</td>
</tr>
<tr>
<td></td>
<td>Phone Calls (3)</td>
<td>$15.00</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>$4.00</td>
</tr>
<tr>
<td></td>
<td>Reschedule</td>
<td>$5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$269.00</td>
</tr>
</tbody>
</table>

#### Lost Revenue Per Year

<table>
<thead>
<tr>
<th>Problem or Defect</th>
<th>Issues Associated with the Problem or Defect</th>
<th>Cost of the Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-</td>
</tr>
</tbody>
</table>

Total estimated cost for the problem or defect per year: $10,222.00
http://www.advancedenergy.org/success_with_quality_management
# Advanced Energy - Success With Quality Management

<table>
<thead>
<tr>
<th>Literature</th>
<th>Quality Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Poor Quality</td>
<td>Cost of Doing Business</td>
</tr>
<tr>
<td>Cracking the Quality Code</td>
<td>Cost of Poor Quality</td>
</tr>
<tr>
<td>Creating a Blame-Free Company</td>
<td>Quality Improvement</td>
</tr>
<tr>
<td>Quality Common Language</td>
<td>Event Log</td>
</tr>
<tr>
<td>Quality Management References</td>
<td></td>
</tr>
</tbody>
</table>
## Cost of Poor Quality

<table>
<thead>
<tr>
<th></th>
<th>Number Of Homes</th>
<th>Number Of Houses Done Wrong</th>
<th>Cost Of Poor Quality Per House</th>
<th>Total Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall Cavities</td>
<td>350</td>
<td>15.0</td>
<td>$3,161</td>
<td>$47,415</td>
</tr>
<tr>
<td>Attic Hatch</td>
<td>350</td>
<td>17.5</td>
<td>$415</td>
<td>$7,245</td>
</tr>
<tr>
<td>CO Monitors</td>
<td>275</td>
<td>55.0</td>
<td>$415</td>
<td>$22,825</td>
</tr>
</tbody>
</table>

**Total Annual Loss** $77,482
6 ADVANTAGES OF USING QUALITY COSTS FOR MANAGEMENT

1. Reducing the cost of poor quality is one of the best ways to increase a company’s profit

2. Provides a single overview of quality

3. Aligns quality and goals

4. Provides a means to measure change/improvement

5. Promotes the effective use of resources

6. Provides incentives for doing the job right every time
ACTION PLAN

- Begin calculating the cost of poor quality
- Understand the 6 advantages of using quality costs to assist in managing your company
- Use the cost of poor quality to measure the level of quality of your company
Quality and Process
A POOR OR MISSING PROCESS
Common people managing a superior process are better than superior people managing a poor process.
Important Fact

"Inspection with the aim of finding the bad ones and throwing them out is too late, ineffective, costly. Quality comes not from inspection but from improvement of the process."

Dr. W. Edwards Deming
Process Converts Input Into Output
What are the inputs?

4

Performance Specifications,
Procedures, Policies,
Requirements,
Code, Etc.

People:
Trade Allies
HVAC Contractor
Insulator
Electrician

Material Needs

Tools and Equipment
Building Quality Into The Process

Training
Coaching
Mistake Proofing
Critical Details
Quality Control
Quality Assurance
Quality Improvement
We Must Build Quality Into Our Processes

Maximizing Waste Reduction
MORE PROFIT
PROCESS

Process Must Include:

EFFICIENCY OF PROCESS
Results achieved vs. resources used

EFFECTIVENESS OF PROCESS
Ability to achieve desired results
Increased Value
Reduced Cost
Fewer Defects
Fewer Callbacks
Reduced Cycle Time
Satisfied & Loyal Customers
Happy And Loyal Employees
We Build Quality Into Our Work Processes

RESOURCES INVESTED

PROCESS QUALITY OF WORK

DO NOT BOLT ON AT THE END

MAXIMIZING PROFIT
Embrace that process fails more than people

Learn that process converts inputs into outputs

Understand that efficiency and effectiveness must be designed into each process
Mistake Proofing
We make mistakes regardless of how careful we are. We must keep them from becoming defects.
CAUSES TO CONSIDER WHEN DESIGNING MISTAKE PROOFING

MISTAKE CAUSES

HUMAN FACTORS

WORKPLACE FACTORS

Noise
Clutter
Repetition
Distraction
Temperature
Poor lighting
Process design

Stress
Fatigue
Low moral
Carelessness
Forgetfulness
LEVELS OF MISTAKE PROOFING

1. AWARENESS
   - Instructions
   - Training & Visual Aids
   - Visual Controls

2. DETECTION
   - QC 100% Inspection*
   - QA Random Inspection

3. PREVENTION
   - Mistake Proofing: Verification Checklists
   - Robust Process Design

*Caution: 100% inspection is subject to worker vigilance
Gas cap tether does not allow the motorist to drive off without the cap.

Filling pipe insert keeps larger, leaded-fuel nozzle from being inserted.

Gas cap is fitted with ratchet to signal proper tightness and prevent over-tightening.
Red indicates rough handling. If red, note on the bill and inspect product.
MISTAKE-PROOFING FOR TAILGATERS
Which dial turns on the burner?

STOVE A vs. STOVE B
Pop-up signal that indicates when the turkey is finished cooking
Hose couplings that break-away and quickly shut-off the flow of gasoline.
You cannot unlatch the door without moving your coat
Field Visual Management

TECH TIPS:
INSULATION

2A Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

[Images showing correct and incorrect installation of insulation]
# Pilot Checklist

## Before Start
- CUSTOMS/CANPAS: UPDATED
- PREFLIGHT: COMPLETE
- LANDING LIGHTS: OFF
- OXYGEN SYSTEM: PLUGGED & CHECKED
- OXYGEN CONTROL VALVES: NORMAL
- GPS: ON
- AL SWITCHES: OFF / NORM / AUTO
- STANDBY ATT: CHECKED & ON
- GENERATORS: GEN (OFF IF GPU START)
- FOOT WARMERS: OPEN
- THROTTLES: OFF
- BATT EMER: CHECKED
- BATTERY ON: CHECKED
- GEAR HANDLE: DOWN & GREEN
- GPU: SET
- AVIONICS: CONNECTED
- WARNING SYS: CHECKED
- CROSSFEED: CHECKED
- INVERTERS: CHECKED
- PRESS & ENVIRONMENT: CHECK & SET
- TRIM / FLAPS: CHECK & SET
- COFFEE: ON
- FUEL: SUFF / BAL

## Before Takeoff
- EXT LIGHTS: ON
- ANTI-CES BLEED: AS REQ'D
- RADAR: ON
- TRANSPONER: TARA
- IGNITION: ON
- TURBOHEAT: ON
- ANNUNCIATORS: CLEAR
- RUNWAY AVAILABLE: 0 or 3000 feet
- PRESSURE: ≥ 800 / ≤ 5000
- TEMPERATURE: ≤ 70° / ≤ 25°
- V0: 100
- VR: 100
- V1: 111
- V2: 118
- WEIGHT: 13,000 to 12,500
- TAKE-OFF NI: 97.3%
- CLIMB S.L.: 95.1%

## Taxi
- BRAKES / NWS: CHECKED
- ANTI-Skid: ON
- CONTROLS: CHECKED
- STANDBY ATT: UNCHECKED
- FLIGHT DIRECTOR: GA / HDG / ALT SELECT
- ENGINE INSTRUMENT: CHECK
- FUEL: SUFF / BAL
- DATA / C.T.C. BRIEF: COMPLETE
- ANTI ICE & W/ S BLEED: CHECK
- 2 PANELS / EMER PRESS: CHECK
- TCAS: T-A

## Transition
- ALTIMETERS: L / R
- ENGINE S/C: AS REQ'D
- LIGHTS: ON
- IGNITION: OFF
- GEAR: DOWN / 3 GREEN / NO RED
- LIGHTS: OFF
- ANNNUNCIATORS: CHECKED
- GENERATION: OFF
- RESCUE / BLEED: AS REQ'D
- OXYGEN MASKS: UNPLUGGED

## Cruise
- ANNNUNCIATOR PANEL: MONITOR
- ENGINE INSTRUMENTS: MONITOR
- FUEL: AS REQ'D
- PRESSURIZATION: CHECK
- OXYGEN: CHECK
- PASSENGER COMPARTMENT: CHECK
- TRIM: CHECK
- ENGINE TREND: RECORD IN JOURNEY LOG

## Descent
- FOOT WARMERS: CLOSE
- DEFIC IN: ON
- AIR CONDITIONER: TARA
- ANTI ICE & W/ S BLEED: AS REQ'd
- FUEL: AS REQ'd
- CIRCLING: IM
- TURBOHEAT: ON
- ANNUNCIATORS: CLEAR
- AUTO / DATA / BRIEF: COMPLETE
- NO COLD AIR
- TRANSPORT: STANDBY
- RUNWAY AVAILABLE: 0 or 3000 feet
- PRESSURE: ≥ 800 / ≤ 5000
- TEMPERATURE: ≤ 70° / ≤ 25°
- V0: 100
- VR: 100
- V1: 111
- V2: 118
- WEIGHT: 14,000 to 13,000
- TAKE-OFF NI: 97.3%
- CLIMB S.L.: 95.1%

## After Landing
- FLAPS: LAND
- AUTOPILOT: OFF
- YAW DAMP: OFF
- FLAPS: AS REQ'D
- SPEED違反: ON
- BREAKS: OFF
- TRANSPONER: STANDBY
- RADAR: STANDBY
- TIME / FUNCTION: RECORD

## Shut Down
- RADAR: OFF
- GROUND: OFF
- TURBOHEAT: OFF
- AVIONICS INVERTERS: OFF
- HEADSETS: OFF
- OXYGEN MASKS: UNPLUGGED

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**CHECKLISTS ARE ESSENTIAL**

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**advanced energy**
Sticks and stones may break your bones—but if you need surgery, the right words used in the operating room can be more powerful than many drugs.

New research published today in the *New England Journal of Medicine* found that when surgical teams heeded a simple checklist—as pilots do before takeoff—patient mortality rates were CUT NEARLY IN HALF AND COMPLICATIONS FELL BY MORE THAN A THIRD.
How many combinations of coffee?
<table>
<thead>
<tr>
<th>Starbucks Closing Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Bar</td>
</tr>
<tr>
<td>Floors</td>
</tr>
<tr>
<td>Drains</td>
</tr>
<tr>
<td>Warming Station</td>
</tr>
<tr>
<td>Sure Shots</td>
</tr>
<tr>
<td>Brewing Station</td>
</tr>
<tr>
<td>Carafes</td>
</tr>
<tr>
<td>RTD/E</td>
</tr>
<tr>
<td>Blenders</td>
</tr>
<tr>
<td>Bathrooms</td>
</tr>
<tr>
<td>Condiment Bar</td>
</tr>
<tr>
<td>Prep</td>
</tr>
<tr>
<td>Lobby</td>
</tr>
<tr>
<td>Newspapers</td>
</tr>
<tr>
<td>Pastry Case 1</td>
</tr>
<tr>
<td>Stock Ice Bins</td>
</tr>
<tr>
<td>Bar 1</td>
</tr>
<tr>
<td>Bar 2</td>
</tr>
<tr>
<td>Clean Glass / Handoff</td>
</tr>
<tr>
<td>Caramels</td>
</tr>
<tr>
<td>Bananas</td>
</tr>
<tr>
<td>Whipped Creams</td>
</tr>
<tr>
<td>Pastry Case 2</td>
</tr>
<tr>
<td>Milk Count / Temps</td>
</tr>
</tbody>
</table>

**Weekly Tasks**

- **Monday:** Urnex
- **Tuesday:** Pumps / Dust Shelves
- **Wednesday:** Ice Bins / Menu Boards
- **Sunday:** Deep Clean Fridges / Scrub Mats
- **Thursday:** Baseboards / Plexis
- **Friday:** Cabinets / Fridge Vents
- **Saturday:** Ice Bins / Grinder
**Duct Sealing:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Self Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUCT SUPPORT has been installed every 4 feet.</td>
<td></td>
</tr>
<tr>
<td>All METAL DUCTS TO PLENUM CONNECTIONS have been securely fastened.</td>
<td></td>
</tr>
<tr>
<td>All FLEX DUCTS TO PLENUM CONNECTIONS have been securely fastened.</td>
<td></td>
</tr>
<tr>
<td>All DUCT BOARD DUCTS TO PLENUM CONNECTIONS have been securely fastened.</td>
<td></td>
</tr>
<tr>
<td>All leaking DUCTS WITHIN 10’OF THE AIR HANDLER have been properly air sealed using mastic and fiberglass mesh for reinforcement.</td>
<td></td>
</tr>
<tr>
<td>All leaking DUCTS MORE THAN 10’ FROM THE AIR HANDLER have been properly air sealed using mastic and fiberglass mesh tape when required.</td>
<td></td>
</tr>
<tr>
<td>All AIR HANDLER CABINET PANELS are properly sealed with UL 181 duct tape.</td>
<td></td>
</tr>
<tr>
<td>All leaking PLENUM CONNECTIONS have been properly air sealed with mastic and fiberglass mesh tape.</td>
<td></td>
</tr>
</tbody>
</table>

I certify that I have inspected all my work and found it to be defect free and complete.

Job # or address
**Attic Insulation Preparation:**

<table>
<thead>
<tr>
<th></th>
<th>Self Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) INSULATION DAMS have been built, with at least 3” clearance, around all COMBUSTION VENTS &amp; FLUES so that the proper depth of insulation may be installed.</td>
<td>![ ] ![ ]</td>
</tr>
<tr>
<td>2) INSULATION DAMS have been built around all ATTIC HATCHES &amp; DOORS and have been air sealed so that the proper depth of insulation may be installed.</td>
<td>![ ] ![ ]</td>
</tr>
<tr>
<td>3) INSULATION DAMS have been built, with at least 3” of clearance, around all NON-INSULATION CONTACT RECESSED LIGHTS so that the proper depth of insulation may be installed.</td>
<td>![ ] ![ ]</td>
</tr>
<tr>
<td>4) All KNEE WALLS have been properly backed and insulated.</td>
<td>![ ] ![ ]</td>
</tr>
</tbody>
</table>

I certify that I have inspected all my work and found it to be defect free and complete.

Job # or address:

Signature
# Design for Manufacturability / Assembly Guidelines

## Injection Molding

### Raw Materials
- Use standard material types, colors, and fills.
- Consider recyclability of the material when selecting.
- Substitute a material that is more economical.
- Substitute a material that is easier to process.
- Mark the part with the material to be used.

### General
- Avoid unnecessary part features & complex shapes - they involve more complex tooling.
- Avoid unnecessary tolerances & finishes.
- Use lowest cost equipment that provides needed capability.

### Part Ejection:
- Place gate & ejector pin locations on underside of part where blemishes are least critical.
- Use draft angles to facilitate part removal. The draft angles should typically be ≥ 0.5° minimum; typically 1° to 2° for 5” depth. Use a greater angle with texture.
- Minimize surface area perpendicular to part line since greater surface area of walls & projections perpendicular to part line requires increased ejection force. Higher ejection forces require longer cooling times. Since cooling is 70%-80% of mold cycle, ejection force is an important DFM factor.
- Reduce ejection force requirement by: considering rib & projection height & surface area; use gussets instead of ribs; use larger draft angles, and polish the mold surface.

### Wall Thickness:
- Keep uniform - less than 15% variation.
- Make transitions gradual.
- Thicker walls require more cooling time; consider ribs as a structural alternative.

### Corners:
- Avoid sharp corners.
- Maintain inner radii > 0.5 x wall thickness.
- Maintain outer radii > 1.5 x wall thickness.
- Maintain inner & outer radii around common center point.
Sticks and stones may break your bones—but if you need surgery, the right words used in the operating room can be more powerful than many drugs.

New research published today in the *New England Journal of Medicine* found that when surgical teams heeded a simple checklist—as pilots do before takeoff—patient mortality rates were CUT NEARLY IN HALF AND COMPLICATIONS FELL BY MORE THAN A THIRD.
<table>
<thead>
<tr>
<th>Quality Check</th>
<th>Spec. #</th>
<th>Measures to be Installed</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>AT 1.3</td>
<td>Install new ducts.</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>AT 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT 2.6</td>
<td>Insulate metal ducts</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>AT 1.10</td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>AT 1.11</td>
<td>Insulate and weatherstrip access panel to R-30.</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>AT 1.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IN 1.0a</td>
<td>Install Pool Pump.</td>
<td>$</td>
</tr>
</tbody>
</table>

I certify that I have inspected all my work and found it to be defect free and complete.
Signature: ______________________________

Dan Ariely is the James B. Duke Professor of Psychology and Behavioral Economics.

https://www.youtube.com/watch?v=onLPDexxXx8
MISTAKE PROOFING CHECK LIST

BENEFITS

- Increases accountability
- Is a strategy for preventing mistakes
- Makes it impossible for defects to pass unnoticed
- Corrects problems as soon as they are detected
- Prevents defects from being covered up
- Stabilizes our processes
- Escalates effectiveness and efficiency
- Eliminates waste
- Creates a safer work environment
- Makes quality problems more visible
- Produces pride of work
- Increases profit
ACTION PLAN

- Identify ways to mistake proof your work
- Plan ways to keep mistakes from becoming expensive defects
QUESTIONS