Mixing the Quality Serum

An excerpt from the upcoming book by:

John Tooley

Foreword

As I stood in the long sterile hall the air reeked of alcohol and the echo of children screaming and crying filled my head. This was much more than my 12-year-old mind could cope with. I was filled with terror as I neared the room where nurses were inoculating children with the polio serum. In 1952, polio was epidemic with 57,628 reported polio cases, most of which were children. It was the worst national epidemic on record. By 1955, the vaccine was available, and U.S. polio cases dropped by 85-90 percent. I was inoculated from this terrifying disease. Prevention saved thousands.

For the last 30 years, I have dedicated my life to working with buildings and the people who design, build, retrofit and rehab them, driven by my desire to make things better. In my experience, I have seen that most people want to do their jobs right. They want to design, build and retrofit homes that are high quality. And yet, year after year, we in the home performance industry find ourselves having to fix the same issues over and over: houses leaking air because they are not air sealed properly, rooms too hot or too cold because insulation or ducts are not installed correctly, or even fire hazards created by improper wiring.

On September 11, 2004 I had a heart attack. The experience made me take a step back and consider my life and my work. I thought about a lot of things, including things my parents had told me when I was young. I remembered when my mother would tell me to look both ways before I crossed the street. As I lay there in the hospital bed, I took her advice and looked both ways, contemplating my past and my future. My mother would be proud of my hesitation as I heeded her words. I decided then, things had to change.

I could no longer continue to walk in circles- working so hard to try and improve the way houses are built or retrofitted, only to find little difference was being made. I realized that although I was totally committed to doing the right thing, I had been doing the right thing wrong, and that's wrong, right?

Then I remembered the words I had heard my father say to me many times in my youth, "Do it right the first time." I realized what a profound statement this is. These words were not just something for parents to say to encourage their children, these words could change the home performance industry, and I was going to try to make that happen.

Here it is, seven years later, and I am much happier on the path I now walk. I am very lucky to work at Advanced Energy, where I have received nothing but encouragement as I work through how to make my industry better. I'd like to take this opportunity to share what I have learned.

Sincerely,

John

Mixing the Quality Serum

For more than three decades, the home performance industry has depended on passing on best practices to ensure jobs are done right. Best practices are like recipes, instructions for how to get something done. Though helpful, best practices are as numerous and varied as recipes for baking bread. There are 100 ways to bake a good loaf of bread depending on which person you talk to. Every bread maker has his or her own unique recipe with different ingredients or techniques. Though all of their bread may be delicious, each loaf has a different taste, look or texture. Following this concept, there are many ways to build or retrofit a house, but without one set of requirements the result is variation and inconsistent houses throughout the nation.

We keep fixing the same things over and over. It's not for lack of trying. We've tried new designs, new products and new training methods. In addition, we try to make sure the end result is good and the right work was done right by inspecting work after it is completed.

We're trying to do the right thing, but maybe we are doing the right thing wrong. Maybe instead of waiting until the end to check the quality of our work, we should follow my father's advice and do it right the first time – build quality into the process instead of bolting it on after. It's expensive and honestly ineffective to try to reduce defects by trying to produce the "best" best practice, to teach-out or inspect-out defects.

Building "in" quality implies actions that are applied internal to a process. Therefore, they are the quality serum that will inoculate our industry and set us free to become a healthy, strong, and successful company. Building in quality is company values that foster a fertile culture where the right tools and ingredients result in the right work being done and done right the first time.

The Quality Serum requires a minimum of five ingredients. It is important to know a serum will not cure the patient. It will only *prevent* the onset of an illness. Prevention is the operative word for both human illness and poor workmanship or service. The Quality Serum is intended at a minimum to prevent:

- Unnecessary operational expense
- Increased cost of service delivery or product production
- Waste
- Late delivery on products or services
- Excessive pricing
- Dissatisfied customers
- Unhappy employees

Ingredient 1: Define Quality

Many have tried to define quality over the past 100 years, and the definitions have been varied to the point of confusion. Everyone views quality from different perspectives. There are three perspectives that have really stood out to me in my professional career and experience, including those of Edward Deming, Joseph Juran and Phillip Crosby. I will not bore you with great detail but will instead try to represent how they have influenced my definition of quality.

Edward Deming

The problem of defining quality was so important to Deming that he devoted an entire chapter of his landmark book, *Out of the Crisis*, to doing just that.[1] In Deming's view, the consumer is by necessity the most important part of the production system. Without a consumer, there is no reason to produce. The question then becomes what the consumer needs or wants, or what the consumer thinks he or she needs or wants. To Deming, the only meaningful definition of quality is that which the consumer specifies.

> Quality is the degree to which a set of desired outcomes fulfill a need or expectation that is stated as requirements.

Joseph Juran

Juran also sees that quality can only be defined by the consumer. In Juran's book, *Leadership for Quality*, he defines quality as "fitness for use."[2] Under this heading, Juran quantifies fitness for use in two different categories:

1. Product features that meet customer needs
2. Freedom from deficiencies

Juran suggests that a company learn what the customer expects from the product or service. At this point, the task is to translate the customer demands into the desired outcomes and features, and come up with a sound plan to produce or deliver them. Adding features to our products and services usually increases the cost; therefore many feel higher quality costs too much.

The second objective is achieved through measuring the results of the product or service and how well it is received in the marketplace. By comparing the actual results with the desired results, acting on deficiencies and providing feedback to the system, continuous improvement can be attained. Freedom from deficiencies will result in quality costing less.

Phillip Crosby

Crosby tends to take a narrower, management-centered view. Crosby sees many of the more nebulous statements about quality (delight the customer, continuous improvement, etc.) as simply extensions of a very basic definition: conformance to requirements.

In Crosby's book, *Quality is Free*, he explains if requirements are clearly communicated to all levels of the company, then an attitude of "no reason for not doing it right" can be built throughout the company.[3] Crosby believes if we did the requirements error free and achieved defect free products and services, we would not only reduce cost but would also increase customer satisfaction or better yet success. Crosby focused on prevention as a means to achieving quality.

From these three giants of quality I have come to my definition of quality. I feel quality is the degree to which a set of desired outcomes fulfill a need or expectation that is stated as requirements.

Price – Quality – Delivery

Customers require products and services of a given quality to be delivered by or be available by a given time and to be of a price that reflects value for money. When we buy a product, we have an expectation as to how long it will last. Anything less than meeting our needs and expectations will result in dissatisfaction. We will consider our product or service to be of poor quality. Another consideration is price. If it exceeds value, no matter how good the quality, the product or service will not survive in the marketplace.

Customers are the only ones who can define value. Our companies do not exist for any other reason than value. Dissatisfied customers, stakeholders or homeowners are the result of a deeper problem.

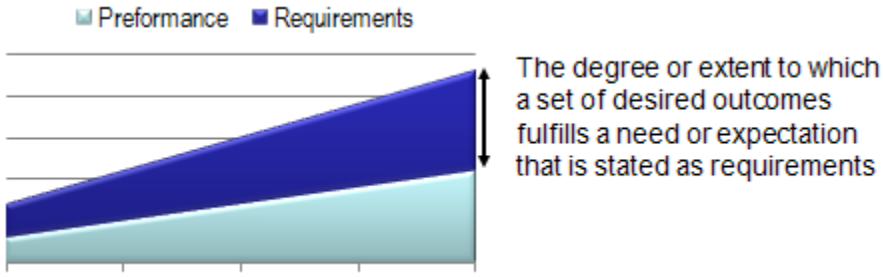
Customer Success

Satisfaction is hard to measure. Sustainable quality must be measurable. Customer success is measurable. Two questions must be answered:

1) What will cause the customer to be delighted because we met their needs and expectations?
2) How can we agree on how to measure it?

The need and expectation must be expressed as requirements that will satisfy both. Defining customer success is more important than whole house assessment. If comfort in a room will bring customer success, then the next step must be defining work requirements that will ensure a delighted customer. Expectation must be managed by agreed measurement of the desired outcome (a comfortable room). Quality can only be measured by the extent we meet desired outcomes through clearly defined work requirements. Then and only then can quality be measured- either you did or did not do the requirements.

The Defining Quality



Requirements must be able to meet the needs and desired outcomes of value defined by the customer. Therefore, defining desired outcome and then establishing minimum requirements that will meet the desired outcome is essential. Crosby expressed the degree of quality of any company is the degree to which the company accepts nonconformance to requirements. Products or services that meet requirements but do not meet the desired outcome of customers can then be considered poor quality. In short, standard work requirements must be developed for companies and programs.

The definition of quality must become a mantra. Everyone in the company must know the definition. Our company's reduced definition is, doing agreed upon requirements. Shortening the definition does not mean we have excluded everything we have discussed to this point. Short and easily remembered is very important. We are growing oak trees that take many years to mature, not squash plants that mature in just a few weeks and are easily stomped out. Defining what quality is and imbedding it into the culture of a company can easily take as much as one year.

INGREDIENT 2: Establish a Blame-Free Workplace

All work is a process. If failure exists, it exists more in the process. If we believe these two statements, when failure visits and it will, we must focus on what happened with our process that allowed the failure. In his book, *Zero Quality Control,* Shigeo Shingo states it is impossible to eliminate all error from any task preformed by humans.[4] Indeed, inadvertent errors are both possible and inevitable. Yet errors will not turn into defects if feedback and action take place at the error stage. It is clear Shingo believes that process can eliminate defects. The majority of people do not come to work with the intent to do their work wrong. In his book, *Human Error,* James Reason states not only must we define correct performance, but also the more predictable varieties of human fallibilities.[5] A worker in a hot attic has no intention to do his or her work wrong; however, the conditions may cause error. None of us intended to lock our keys in the car or to run out of gas. Error is to be anticipated. It is imperative we design processes to eliminate mistakes and errors.

A blame-free workplace does not do away with accountability. Accountable does not mean "blame-able." To be accountable means to be responsible and answerable for an activity. If something goes wrong, those accountable are expected to answer for their part in the questioned activities, because we need their knowledge if we want to perfect our imperfect systems. Blame is something more. To be blamed is to be accountable in a way deserving of censure, discipline or other penalty, either explicit or tacit.

All defects are caused and all causes can be prevented. The first step in quality improvement must be all blame must fall on the process. Blame causes fear and fear causes workers to shut down and seek cover. The more blame the less we learn from failure and the less root cause is identified. The British statesman and philosopher Edmond Burke said, "No passion so effectively robs the mind of all its powers of acting and reasoning as fear." Deming agreed, saying "Quality is impossible where people are afraid to tell the truth." Solution and prevention must accompany establishing a blame-free workplace.

In the book *The Dance of Change,* Peter Senge states the challenge of fear and anxiety may well be the most frequently faced challenge in sustaining profound change and the most difficult to overcome.[6] This step will require long-term commitment. Every occurrence of blaming people must be put down and directed to the process. An exception might be when a person willfully chooses not to follow standard work requirements, steals or commits another egregious infraction. Management must lead the important step of a blame- or fault-free workplace. It will have a large return on investment.

What's wrong with blame?

- **If it works, it's a short term solution without positive long term effects**
- **Blame often models exactly those behaviors and values you want employees to avoid**
- **Blame is a form of punishment and tends to create followers, not leaders, because it rarely allows for feedback**
- **Blame may be a last-ditch effort by desperate supervisors, thus not a thoughtful act**
- **It doesn't matter who is to blame – what matters is fixing what isn't working**

INGREDIENT 3: Define Standardized Work Requirements (SWR)

During the period of banishing blame, the process or lack of must become the center of attention. To blame a poor process or understand the lack of one is not enough. Guidance must be given to identify the problem, research (ask "Why?" five times), solution formulation, document the desired outcome for the future and establish the SWR and how it will be satisfied by our products and services. Train and implement the process to satisfy the new SWR. Check the implementation for flaws. The challenge is developing solutions in the form of SWR. It is easy to identify lack of a process or how poor a process might be. It is much harder to give leadership toward expression of our creativity.

The U.S. Department of Energy National Renewable Laboratory developed guidelines for the residential retrofit workforce. A major component of the guidelines is Standard Work Specifications (SWS). This is a monumental work that will serve us for decades to come. The guidelines define SWS as the performance requirements for high quality energy efficient retrofit work and the minimum conditions necessary to achieve the desired outcomes of a given retrofit measure. SWR is not different. I am driven by defining quality as the degree to which a set of desired outcomes fulfill a need or expectation that is stated *as requirements*. That is why I call them Standard Work Requirements.

Topic: Attic Sealing

Subtopic: Attic Pocket Doors

2) **Detail Name:** Pocket Door

Desired Outcome:

- Pocket door sealed to prevent leakage [1]

Row	Title	Specification(s)	Objective(s)
1	**Backing and infill**	Backing or infill will be provided as needed to meet the specific characteristics of the selected material and the characteristics of the hole The infill will not bend, sag or move once installed	Minimize hole size to ensure successful use of sealant Ensure closure is permanent and supports any load (e.g. wind and insulation) Ensure sealant does not fall out
2	**Sealant selection**	Sealants will be compatible with their intended surfaces Sealants will be continuous and meet fire barrier specifications [2]	Select permanent sealant Ensure sealant meets or exceeds the performance characteristics of the surrounding materials

Both SWS and SWR are specific critical requirements that allow work processes to be completed in a consistent, timely and repeatable manner. A job is completed exactly the same way every time no matter who is performing the work. By implementing SWR those doing the work will increase production, improve quality and enjoy a safer, more predictable working environment. It is very difficult to determine what went wrong if the job is not always accomplished consistently every time. Arriving at the root cause of a problem will be nearly impossible if the process for doing the work is left up to opinion and there are several ways the job is being done. Variation in any job only lends to increased defects.

Where there are no SWR, there can be no continual improvement. A company cannot involve workers in continuous improvement if there are several ways to do a job. It is important to create a culture of continuous improvement that is founded on standardized work and training. Where these two exist, job satisfaction and interest in one's job will rise. Wasting time and materials are accepted as two major causes for operating budgets to be higher than desired. Wasting our people's knowledge and abilities is by far a larger driver of expense. SWR allows everyone to know what is expected. Once this takes place, management must encourage everyone to help improve the work methods to satisfy the SWR. Management can now oversee and approve improvement, large and small. This is where both the employees and management are in a win-win situation. Continual involvement is encouraged and it is essential for everyone doing the standardized work to have input into the best way for the work to be completed because they are the experts at doing the work.

Benefits of SWR:

- Provides a clear basis for training
- Increases job safety
- Establishes process stability
- Assists inspection and problem solving
- Creates a baseline for improvement
- Enables effective employee involvement and mistake-proofing
- Maintains organizational knowledge

Requirements that are not measurable, practical, easy to accomplish and able to meet desired outcomes will be riddled with poor quality. All SWR must be developed to be **S.A.F.E.** (Simple, Assessable, Feasible, Effective)

- **Simple** to the extent that the work method can be taught easily
- **Assessable** so that right from wrong can be gauged (measured without question)
- **Feasible** where the work is practical, possible and easily done by most people
- **Effective** in meeting desired outcomes

Products and services that conform to SWR and consumer success should be considered products and services of quality. As mentioned earlier, a consumer may want a comfortable room. Meeting that requirement may result in an adverse affect the consumer would never desire at the expense of meeting his or her primary need or desire. Requirements must be considered using system thinking that understands quality, price and delivery are not the only considerations. Interactions, interdependencies and sequences must also be considered. If a product or service is unreliable or delivered late, it can be considered unfit for use and of poor quality. If our products are reliable and delivered on time but cause a health, safety or durability problem, we can consider them poor quality. Therefore, reliability, health and safety, and durability must be considered as needs and expectations that must be expressed as minimum requirements. A company cannot only concentrate on the voice of the customer but must see reliability, health and safety and durability are interrelated and interdependent. Deterioration in one leads to deterioration in all.

INGREDIENT 4: Competency Training

Psychologist Edgar H. Schein in his book, *Organizational Culture and Leadership*, dismisses the popular notion that learning is fun.[7] Schein further states learning is driven either by the fear of learning something new or the fear of survival. In order to succeed as a learning organization or as a trainer, each must first understand the two concepts: survival anxiety and learning anxiety. According to Schein, real change does not start to happen until the individual or organization is experiencing some real threat or some real pain. This is what he calls survival anxiety. Now, the prospect of learning something new also produces an anxiety. This is what Schein calls learning anxiety. It may mean we will expose our incompetence. And then we justify that the change is not that important. Learning anxiety is the basis for resistance to change. Anxiety inhibits learning, but anxiety is also necessary if learning is going to happen at all.

In the article, “The Anxiety of Learning," Schein says the first principle says that learning can begin only when survival anxiety is more than the learning anxiety.[8] In an organizational setting it can be

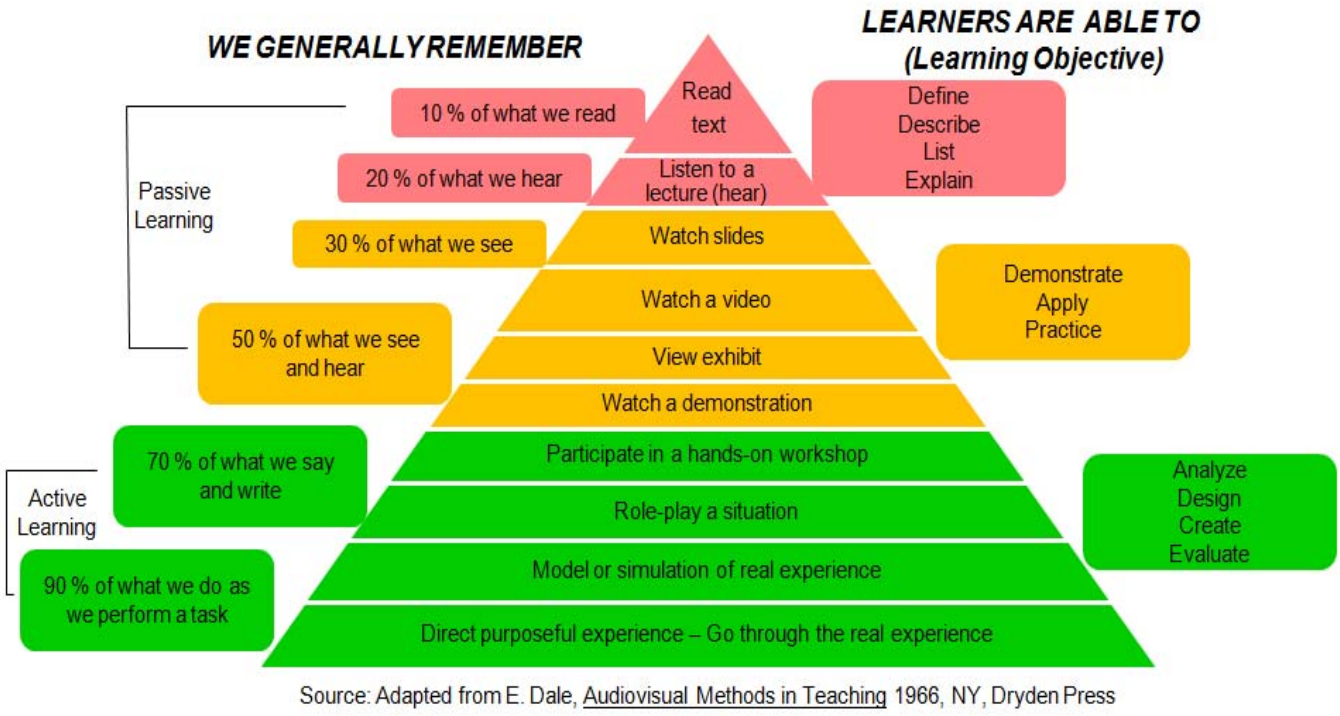
achieved in two ways: by increasing survival anxiety (i.e., saying do this or else)and by reducing learning anxiety by creating a psychological safety net in the form of training, assurance that it is ok to fail. Our organizations must have two strong attitudes:

1) Survival anxiety must be greater than learning anxiety, and
2) Learning anxiety must be reduced rather than increasing survival anxiety.

Our energy, particularly fear, can be oriented and employed as an effective tool for success. To think we can heal fear is to deny it power in our lives. Serum does not cure but prevents. We must prevent fear whenever possible and encourage fear where appropriate. Failure is the fertile ground of learning and improvement. Failure, mistakes and errors are considered by most to be feared. Everyone from the top to the bottom must prevent this form of fear and direct its energy to the process and its improvement. Fail early and learn fast, two very positive ingredients of a creative and innovative company. The company that drives out inappropriate fear will experience employees that will have enthusiasm and willingness to commit to any transformational quality initiative. It seems that there are two areas that will develop openness, first, a feeling of safety in the workplace where everyone can take appropriate risks and second, enhanced learning capabilities.

Awareness versus competency training is very important when asking our workers to perform a task. Training that causes workers to be aware of what must be done does not get the task done where customer success is ensured. Only trainings that result in competency will ensure any task will be accomplished according to the SWR. Competency training must originate from clear job task analysis (JTA) and identification of the knowledge, skills and abilities (KSA) one must have or acquire through training. Therefore, training must be designed to clear objectives accounting for both JTA and KSA. During the 1960s, Edgar Dale theorized that learners retain more information by what they do as opposed to what is heard, read or observed.

Dale's Cone of Learning[9]

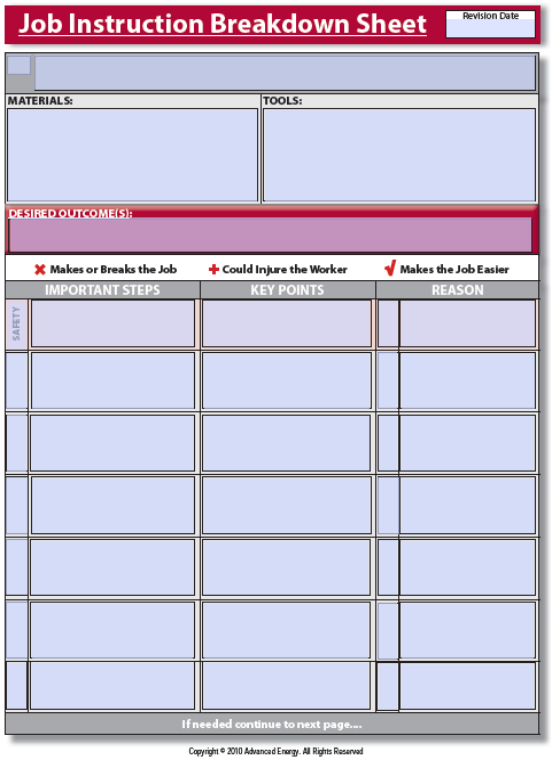


Source: Adapted from E. Dale, Audiovisual Methods in Teaching 1966, NY, Dryden Press

Dale's research found that the least effective method at the top of the pyramid involves learning from information read or received in our classrooms through lectures. The most effective methods at the bottom of the pyramid, involve direct, purposeful learning experiences, such as hands-on or field experience. These experiences represent what workers experience in their workplace. Dale's cone also charts the average retention rate for various methods of training. The further you progress down the cone, the greater the learning and the more information is likely to be retained. It also suggests that when choosing an instructional method, it is important to remember that active learning (involving workers) in the process strengthens knowledge retention. Lastly, learning objectives must be considered in order to ensure workers are trained at a level where customer success is ensured. It is important to understand process converts inputs into outputs (desired outcomes). A well designed training process converts workers into empowered people who can deliver on the desired outcomes of the customer success.

First, all job tasks must be preformed to an agreed upon standard work requirement. The most important skill a curriculum developer must possess is knowledge of the job. That knowledge at a minimum must satisfy six critical areas:

1. Critical knowledge to be proficient at a job
2. System thinking applied to each job (interactions, interdependencies, sequences)
3. Quality issues of the job
4. Key points of the job necessary to prevent defects
5. Knacks and tricks to perform the job efficiently
6. Codes and standards governing the job
7. Material requirements essential for the task



Incorrect information perfectly delivered will not yield the desired results.

When developing curriculum for a job task it is important to identify 20 percent of the total content that is ABSOLUTELY critical to achieving consistent results, followed by the important items that make up nearly 80 percent of the work content. That means that roughly 20 percent of the entire job may have some degree of variability, but the desired results can still be consistently achieved.

The Job Instruction Breakdown (JIB) sheet was used during World War II by the Training Within Industry (TWI) program to ensure high quality war products. The JIB is broken down into three areas:

1. Important steps that move the job forward,

2. Key points that either make or break the job, make the job easier, or will injure the worker, and

3. The reasons for the key points.

This approach of teaching has proven very successful in training competency. The trainer must only teach as much as the worker can learn and be competent at at any one time. Only supervisors and trainers who know how to do the job should teach. If the worker has not learned, the process is not adequate and is in need of improvement.

Teaching ability without a deep knowledge of the work and the ability to distinguish the critical aspects pass on only minimal or incorrect information.

Certification falls into two areas, internal and external. As time has passed, more people and companies have joined in the quest of producing high performance. Internal certification must become the first step to external certification. Each has value to the company, internal-a career ladder, external-a mark of superior performance.

Out of the desire to keep this industry pure, many are convinced that certification of individuals and companies is an important if not essential ingredient. We cannot design credibility. It is an internal motivation and *cannot* be driven by any external source. Synonyms of certify are confirm, verify, prove, validate for credibility, trustworthiness, integrity and sincerity. We cannot certify integrity and trustworthiness.

The quality of our work must become an in-house certification. It must become the very heartbeat of the industry and found in the heart of each person and company. "I certify that the work we/I do conforms to and exceeds all Standardized Work Requirements." Fit for use is still the primary criterion for ensuring a quality product. A company must stand and fall on its promise or customer success.

If we believe that processes fail more than people, shouldn't that drive appraisal of cultures, processes and systems more than appraisal of people? Certification is based on appraisal. Certification tries to divide one company's or person's performance from another. Certification assumes:

- That there are good performers and bad performers,
- That we can tell the good from the bad,
- That those who achieve certification are good performers, and
- That those who aren't certified are contributors to defects more than those who are certified.

The problem is these are myths. Homeowners are better served by a company's processes. Processes that are sustainable and ensure homes serviced by that company will be more healthy and safe, durable, comfortable, energy efficient and environmentally responsible. Homeowners can feel more confident with a company that guarantees customer success. This company would certify that at a minimum the critical processes and attributes for performance appraisal are central, is actively engaged in continual improvement and are vigorously seeking to create a blame-free workplace. Our highest priority when certifying a company should focus on culture, processes and systems. Secondarily, we will certify company documented individuals knowledge and skill sets compared to SWR.

The nature of workers, or more specifically the kind of character produced in our society, cannot be counted on to insulate themselves from the direction of authority. A substantial proportion of people do what they are told to do, no matter what the job and without limitations of conscience, so long as they perceive that the command comes from a legitimate authority. (For more information read, Stanley Milgram's *Obedience to Authority*[10])

Certification of skills must begin within a company's walls. The execution of defect-free work begins at the top of any company. An attitude of no defect is acceptable is not a bottom up movement, it is a top down culture. By culture I mean the way we automatically think and act every day.

Management with good intentions can still be inadequate to produce SWR that are defect free. All work is a process, all defects are caused and all causes can be prevented. Companies that seek all the attributes listed below will also need processes that will ensure their desired outcome.

- To prepare their company for the ever-changing market place
- Prove that their employees are knowledgeable
- Enhance their ability to fulfill clients' needs
- Define employees as recognized experts
- Improve effectiveness on the job
- Strengthen the career advancement opportunities for employees
- Distinguish their employees from others
- Build confidence
- Increase retention

Process fails much more than workers. We must begin internal certification with establishing processes that will reinforce desired outcomes. We must avoid acts of futility like:

- Blaming workers for process problems that are beyond their control,
- Inspecting a flawed process expecting quality,
- Improving a process that produces the wrong outcome, and
- Inspecting a process without the objective being prevention of defects.

Internal certification of skills that accomplish company SWR, are driven by active management and founded on positive results is more productive than passive management mandated requirements. Executive (champion) representation and support both financially and professionally are essential. Managers that are committed to coaching, instructing and mentoring are elements that ensure an internal certification. Deming said "drive out fear" or in short, create a blame-free workplace that blames the process more than the workers. This is a fertile ground for preparation for certification of skills. Internal certification is the foundation of external certification. Management should be proud to have its work processes and workers examined and then certified externally.

INGREDIENT 5: Continual Improvements

A company's products and services must be affordable, uniform and consistent, and perform dependably and result in customer success. The quality of products and services cannot be better than the intentions and requirements of management. Quality results from the way managers lead. Management must create the culture that enables quality to be built into their products and services. Didn't Knute Rockne motivate the Fighting Irish in his stirring half time speech, to "win one for the Gipper?" The never-asked alternative question: "Would Notre Dame have won the game without the speech?" Peter R. Scholtes' book, *The Leader's Handbook*, submits that what won the game was the training, conditioning and coaching that began years before the fateful game.[11] As in any sport, winning in business is not caused by motivating speeches, occasional training classes, improved instruction or

new methodologies. Winning in business is caused by a culture of prevention, a capable workforce and an on-going commitment by management that things are done right, efficiently and consistently.

The majority of our labor force comes to work wanting to do their job right. Management can rob people of their pride of workmanship if they let cost and schedule interfere with doing the right things right. Management must establish a supportive culture and processes that will ensure all work is done right the first time. Processes fail much more than our workers. Willing employees managing a poor process only result in defective work, waste, liability and discouraged workers. However, utilizing processes that make defective work less possible will result in increased profits and satisfied customers. When capable work processes are coupled with a fertile workplace that is blame free, improvements are maximized.

Advanced Energy's interest is not to just deliver more training. Our interest is in quality, helping companies establish a capable process and culture that will ensure program related success factors. Our approach is a system approach, which begins with management. What will help our labor change and do defect-free work is a company culture of prevention, not just a change of the labor skill set. If there is not a culture of defect-free work, prevention, continual improvement and a blame-free workplace then the risk will be high. A prevention-oriented culture can only be established and maintained by management's continual commitment.

Process improvement is dependent upon free feedback and engaging willing workers that are not motivated out of fear. SWR are the only way to ensure improvement. Another WWII TWI process for defect-free product production was called Job Method. Each person trained was given a small card printed on both sides to help workers and supervisors remember the critical components to ensure process improvement.

HOW TO IMPROVE

JOB METHOD

A practical plan to help you produce greater *quantities of quality products in less time* by making the **best use** of the **Manpower, Machines and Materials now available.**

STEP 1 – BREAK DOWN THE JOB

a. List all details of the job exactly as done in the current method

b. Be sure details include everything
- Material handling
- Machine and tool work
- Hand work

STEP 2 – QUESTION EVERY DETAIL

Use these types of questions:
- **WHY** is it necessary?
- **WHAT** is its purpose?
- **WHERE** should it be done?
- **WHO** is best qualified to do it?
- **HOW** is the "best way" to do it?

Question the following at the same time: Materials, Machines, Tools, Equipment, Product Design, Workplace, Movement, Safety, Housekeeping

STEP 3 – DEVELOP THE NEW METHOD

a. **ELIMINATE** unnecessary details
b. **COMBINE** details when practical
c. **REARRANGE** details for better sequence
d. **SIMPLIFY** all necessary details

To make the job easier and safer to do:

a. Put materials, tools and equipment into the best position and within convenient reach for the worker
b. Work out your ideas WITH OTHERS
c. WRITE UP the proposed mew method

STEP 4 - APPLY THE NEW METHOD

a. SELL your proposal to the boss
b. SELL the new method to workers
c. Get FINAL APPROVAL of all concerned on safety, quality, cost, etc.
d. PUT the new method TO WORK. Use it until a **better** way is developed.
e. Give CREDIT where credit is due

Continual improvement is not a management function. ***The person doing the job knows more about it than anyone else in the world and is therefore the one person best fitted to improve it.*** Management must empower, lead, coach and build a culture and processes that capitalize on improvement. A good starting place is to help everyone begin asking the right questions about a process or problem. The 5W2H approach will help in this effort.

5W2H QUESTIONS FOR IMPROVEMENT			
People	5W2H	Typical Questions for Processes	Improvement Questions
	Who?	Who does this? Who should be involved but is not? Who is involved but should not be? Who has to approve?	Should someone else do it? Could fewer people do it? Could approvals be eliminated?
Subject Matter	What?	What is done? What is essential?	Does every step have to be done? Are steps omitted?
Sequence	When?	When is this activity started? When does it end? When is repeated?	Can it be done at a different time? Can cycle time be shortened? Can it be done less frequently?
Location	Where?	Where is this activity done?	Can it be done somewhere else?
Purpose	Why?	Why do we do this?	Can it be eliminated? Can another group or person do it? Can it be outsourced?
Method	How?	How is it done?	Is there a better way?
Cost	How much?	How much does it cost?	How much less could it cost?

The root of quality is managers who serve as an anchor, firmly holding the company to the successful principles of quality management that ensure success. They provide the resources for their most valuable asset, their willing workers. Quality work is a journey; companies will never meet all of their performance objectives on day one. Companies can begin day one with a resolution to the relentless pursuit of perfection through continual improvement. Total employee participatory process improvement must be the outcome of mixing the quality serum.

Effects of participatory process improvement:

1 Direct effects	2 Educational effects	3 Interpersonal effects
• Improving the work methods	• Making thinking a habit	• Improving communication between workers and supervisors
• Creating a work place where it is easier to work	• Increasing problem awareness	• Improving communication among fellow workers
• Improving productivity	• Increasing cost awareness	• Improving the cooperative spirit in the workplace
• Reducing cost and expenses	• Realizing the need to do it yourself	
• Improving and developing know - how		
• Improving safety		
• Improving quality		
• Streamlining and increasing the efficiency of critical work		
THESE RESULT IN: • Increased profits	**THESE RESULT IN:** • Greater motivation • Improved worker ability	**THESE RESULT IN:** • Better communication • Improved interpersonal relationships • Invigorated workplace

Adopted from: The Idea Book, Improvement through TEI (Total Employment Involvement)[21]

Kenjiro Yamada, Managing Director, Japan Human Relations Association said they found there are three stages to implementing employee participatory process improvement:

1. Participation involvement is stressed (typically one to three years)
2. Involvement and education of workers to equip them with problem identification and solutions (lasting two to three years), and
3. Management focuses on economic impact of improvement suggestions (usually 5 years from start).

There are major differences between how American workers see themselves from those of the Japanese. We are raised from youth to advance ourselves and be more. We want to know "What's in it for me?" rather than the eastern approach of "How I might advance the team?" Success is where our workers believe all for one and one for all. This does not take away the workers' individualism but should be led to help all employees to see they don't have to know everything. They can be weak where others are strong and the reverse. The strength is in the team. We need to develop self directed and motivated teams. Improvement should be encouraged through small groups identifying problems and presenting solutions.

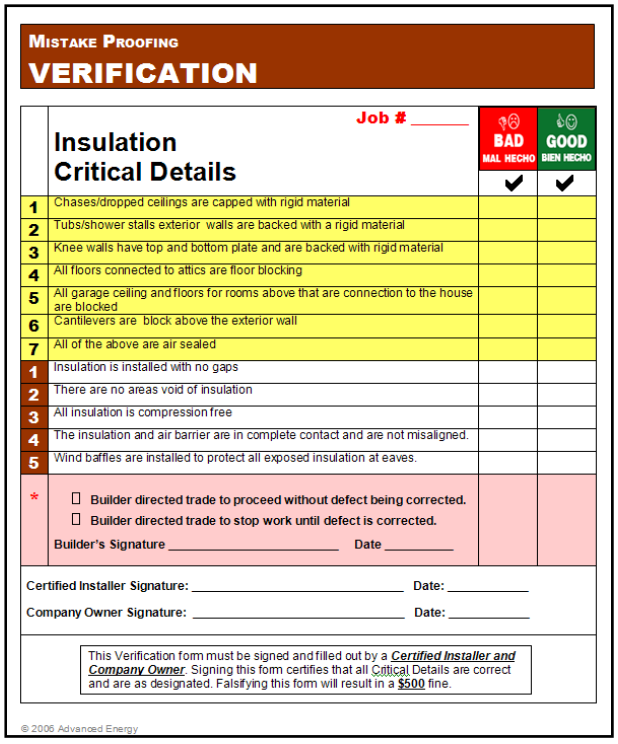
Mistake Proofing

A mistake proofing device is any mechanism that either prevents a mistake from being made or makes the mistake obvious at a glance. The ability to find mistakes at a glance is essential because the causes of defects lie in worker errors, and defects are the results of neglecting those errors. It follows

that mistakes will not turn into defects if worker errors are discovered and eliminated while the work is in process. Defects arise because errors are made. The two have a cause-and-effect relationship, yet errors will not turn into defects if feedback and action take place at the error stage where the work is done. The cost of rework at this point is also minimal, although the preferred outcome is still to find defect-free work at the end of a job and to avoid rework even when its cost is small. In such cases, mistake proofing devices are often an effective alternative to demands for greater worker diligence and exhortations to be more careful. (For more information read *Mistake Proofing for Operators* by Productivity PRESS Development Team[13])

We often consider inspection as the primary means for detecting defects. Checking ones work at the point of work before leaving the workplace is a form of inspection. In chapter 5 of his book, *Zero Quality Control: Source Inspections and the Poka – Yoke system*, Shigeo Shingo identifies three types of inspection:

1. Inspections that discover defects – **Judgment inspections** – objective is prevention
2. Inspections that reduce defects – **Informative inspections** – objective is prevention and improvement, and
3. Inspections that eliminate defects – **Source inspections** – objective is eradication of defects.[14]



MISTAKE PROOFING
VERIFICATION

Job # _____

Insulation
Critical Details

		BAD MAL HECHO	GOOD BIEN HECHO
		✔	✔
1	Chases/dropped ceilings are capped with rigid material		
2	Tubs/shower stalls exterior walls are backed with a rigid material		
3	Knee walls have top and bottom plate and are backed with rigid material		
4	All floors connected to attics are floor blocking		
5	All garage ceiling and floors for rooms above that are connection to the house are blocked		
6	Cantilevers are block above the exterior wall		
7	All of the above are air sealed		
1	Insulation is installed with no gaps		
2	There are no areas void of insulation		
3	All insulation is compression free		
4	The insulation and air barrier are in complete contact and are not misaligned.		
5	Wind baffles are installed to protect all exposed insulation at eaves.		
*	☐ Builder directed trade to proceed without defect being corrected. ☐ Builder directed trade to stop work until defect is corrected. Builder's Signature _____ Date _____		

Certified Installer Signature: _____ Date: _____

Company Owner Signature: _____ Date: _____

This Verification form must be signed and filled out by a ***Certified Installer and Company Owner***. Signing this form certifies that all Critical Details are correct and are as designated. Falsifying this form will result in a $500 fine.

Judgment inspection involves identifying defective work. Generally this inspection is done by someone other than the person doing the work. It is sometimes referred to as "inspecting in quality." The objective of judgment inspection is just that, judge right from wrong after the work is done. Deming said “it’s too late and too expensive, quality does not come from inspection it comes from improvement of the process.” When quality control or assurance uses judgment inspection, it must focus on prevention of defects.

Informative inspection uses data gained from inspection to improve the process and focuses on prevention of defects. One method we like where more than one contractor is working is having each job inspect the work of the prior worker; quality feedback can be given in a timely fashion. Successive checks are having the nearest downstream person check the critical work of the prior worker. Each worker performs both production and quality inspection.

Effective mistake proofing devices make such an inspection system possible by reducing the time and cost of inspection to near zero. Because these inspections entail minimal cost, every critical item may be inspected. While successive checks provide rapid feedback, having the person who performs the work check his or her own work provides even faster feedback. Self-checks use mistake proofing devices (forms, technical tips) to allow workers to assess the quality of their own work. Because they check all of their work they are able to recognize what conditions allowed the last work to be defective. This insight

is used to prevent further defects. Self-checks should be referred to as successive checks whenever possible.

In the book *The Checklist Manifesto – How to Get Things Right*, Atul Gawande explains that "experts are up against two difficulties.[15] The first is the fallibility of human memory and attention, especially when it comes to mundane, routine matters that are easily overlooked under the strain of more pressing events." He was talking about doctors. The same is true for pilots and their mistake proofing check lists. We must join this easy approach to reduction of errors and mistakes. We need a process to help prevent mistakes and improve the process of important work steps, key points to ensure safety, work method, and ways to make the job easier. Everyone must understand that mistake proofing is a defect prevention and improvement process. It should start in the workplace. Therefore, workers and supervisors must see MP not as a reporting of what was not done right the first time but an identification of causes of problems and development of solutions that can prevent the problem in the future.

Source inspection determines before the fact whether the conditions necessary for high quality production exist. The occurrence of a defect is the result of some condition or action, and it is possible to eliminate defects entirely by pursuing the cause. With source inspection, mistake proofing devices ensure that proper conditions exist prior to actual work beginning. Often these devices are also designed to prevent production from occurring until the necessary conditions are satisfied (backing knee walls prior to insulation). Source inspection, self-checks and successive checks are inspection techniques used to understand and manage the production process more effectively. These inspection techniques are intended to increase the speed with which quality feedback is received, although every item is inspected.

Our judgment inspections should be done to identify critical areas in need of *prevention*. Informative self-checks and successive checks provide feedback about the work done. Self-checks and successive checks should be used when source inspection cannot eliminate defects. Source inspection is intended to keep defects from occurring.

Mixing the quality serum requires all of the ingredients or prevention will suffer. Patience and persistence will be good bed fellows. Your pursuit will bring large returns. Your company will flourish; you will have lifted your employees to a place of innovation and creativity and will deliver success to your customers.

About the Author

John Tooley is one of the nation's leaders in the area of building science technologies. Hailed as a visionary in energy efficiency, Tooley has diagnosed and repaired more than 5,000 homes. He has participated in the weatherization of more than 10,000 homes. He is recognized for his contributions to many of the largest utility and building programs in the nation.

Before joining Advanced Energy in 1996, Tooley led a number of companies dedicated to preserving the state of Florida through quality building practices. These companies included: Natural Florida Homes, Natural Florida Retrofit Inc., Star Insulation, Home Energy Reviews of Orlando (HERO), and Infrared Services and Inspections.

Today, Tooley is responsible for business development with the organization's Applied Building Science team. Regarded as a pioneer in the world of energy efficiency, Tooley trains builders and contractors all over the United States.

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