

AN ENGINEER'S GUIDE TO

Unconventional Problem Solving

*5 Step guide to problem solving and how to
succeed at it.*

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StoneWall

A Publication of

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ENGINEERING | MANUFACTURING | VENTURES

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CHAPTER ONE

Understand the “Real” Problem



Ask the right questions!

“If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it,” -Albert Einstein

What does your problem solving process look like? Need a head start? See a beginner’s guide below.

The Problem-Definition Process

1. Establish the Need for a Solution

- **What is the** basic need?
- **What is the** desired outcome?
- **Who stands to** benefit and why?

2. Justify the need

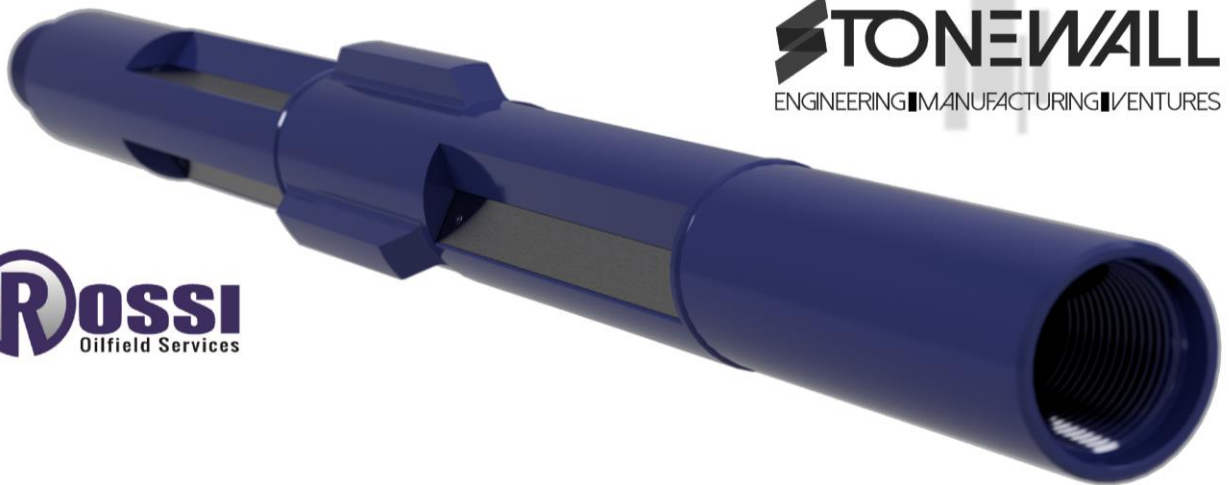
- **Is the effort** aligned with our strategy?
- **What are the** desired benefits for the company, and how will we measure them?
- **How will we** ensure that a solution is implemented?

3. Contextualize the problem

- **What approaches have** we tried?
- **What have others** tried?
- **What are the** internal and external constraints on implementing a solution?

4. Write the problem statement

- **Is the problem** actually many problems?
- **What requirements must** a solution meet?
- **Which problem solvers** should we engage?
- **What information and** language should the problem statement include?
- **What do solvers** need to submit?
- **What incentives do** solvers need?
- **How will solutions** be evaluated and success measured?



[StoneWall](#) teamed up with partners at Rossi Oilfield Services to put our problem solving process to work. Together, we designed and manufactured a new line of downhole tools. (See next page for more information.)

“ Most people prefer a problem they can’t solve to a solution they don’t like ”

Dr. Lee Thayer

Want real-world examples?

Click the links below to see how StoneWall supported two of it's customers in designing a new downhole tools.

[Rossi MagZilla](#)

[Dissolvable Frac Plug](#)





CHAPTER TWO

Educate Yourself



You cannot possibly be fully competent in all aspects of the process.

Knowing about is not the same thing as knowing how!

What is Competency?

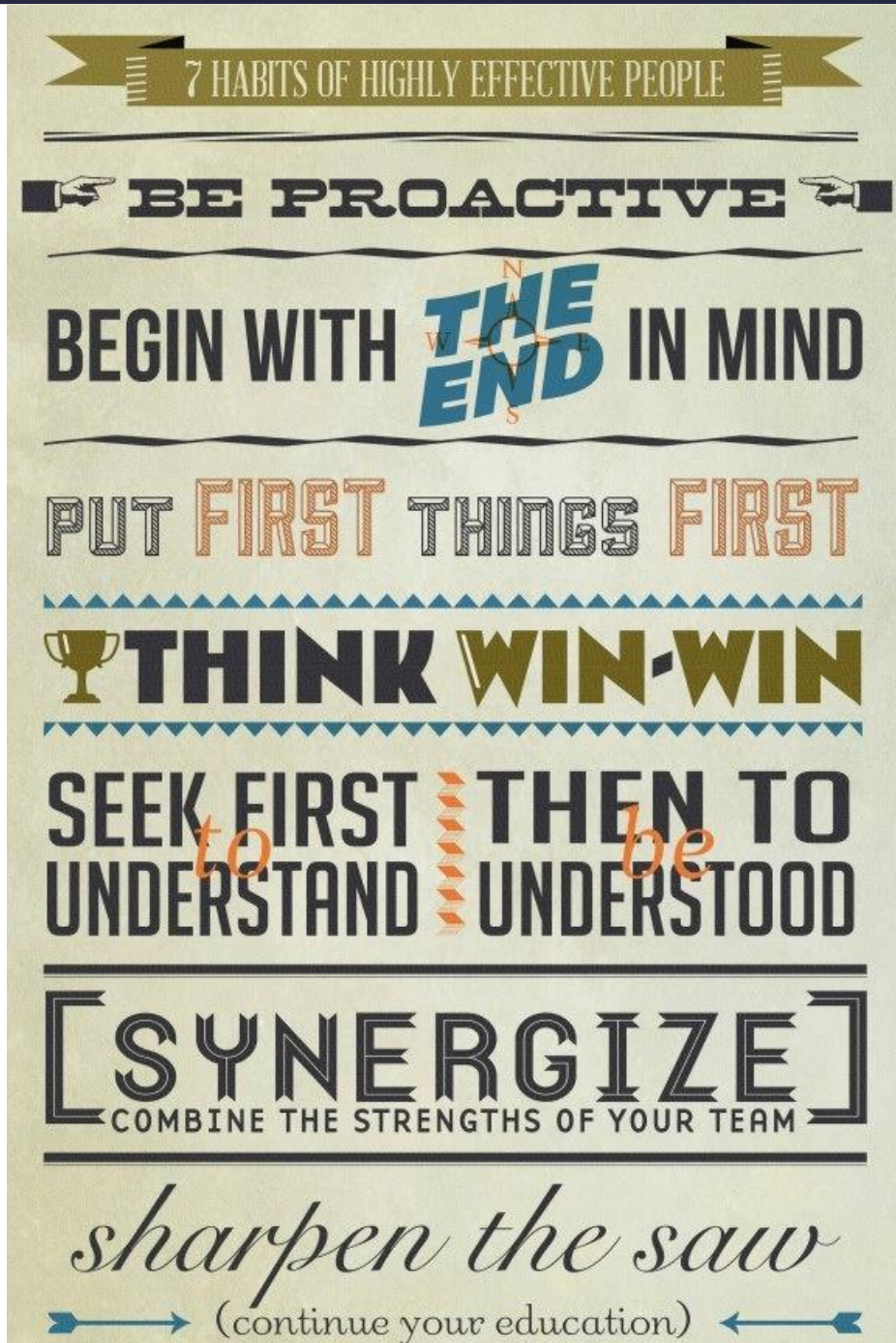
- **Competencies are bundles of habits.**
 - Whatever we are capable of doing depends upon bundles of habits over which we have no immediate control. For a person to do something differently, or better, requires fundamental changes in fundamental habits, not one of which can be dealt with tangibly. The path of practice by which these habits got ingrained is something we will never know – too complex, too subtle, too out of conscious intention or control. They have to be changed in the same way we got them in the first place – by practice, practice, practice.
- **Competency is true empowerment.**
 - *“The issue is not empowering people. It is helping and making it necessary for them, to become competent. It is competence that is empowering, not a management technique.” –Dr. Lee Thayer*

How do you become Competent?

- **Start creating the habits that make a difference**
 - We are led by our habits – of feeling, of thinking, of perceiving, and of understanding. Get those right, and everything beyond becomes possible. Get those wrong, and the outcomes will always be something you didn't choose.
- **Empower yourself**
 - A person who believes that winning a gold medal at the Olympics is his chosen destiny and who is dedicated to doing whatever it takes to get there, is empowered. A person who is simply told she can be “anything she wants to be” is not.
 - Getting on the path to real achievement personally requires ownership of the problems of one's destiny – and thus everything that happens between here and there.

Need a place to start?

Here is a good place!





CHAPTER THREE

Obviate the Noise



As engineers, we have a tendency to distract ourselves with useless calculations, or problems, that don't matter.

What constitutes a problem for one person may not even be seen by another.

What is a problem?

- A problem is some sort of discrepancy between the way things are and the way we believe things ought to be.
- The first thing that leaders learn about problems – and learn to the bone – is that a problem is **something that is had only by people**.
- The perception of the problem, the name given to it, and the solutions applied are primarily functions of the **minds involved**. They are interpretations constructed by those minds. They are not **reality**.

How do you obviate perceived problems?

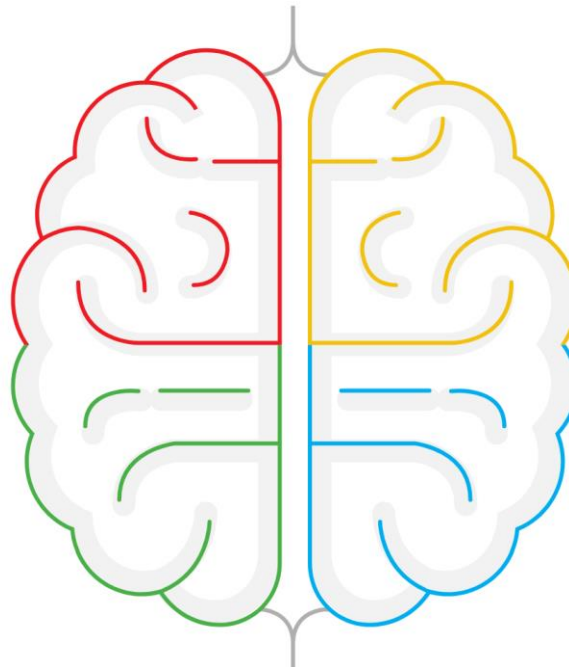
- 1. Choose the problems you want to have.**
 - The leader, knowing that problems are inevitable, attempts to create the circumstances out of which will emerge the problems he or she prefers to have.
 - Ask yourself, What problems am I choosing with the solution I am proposing?
- 2. Own your own problems and make it necessary for other to do the same.**
 - Don't ask, "What is the problem?" Ask rather, "What is **whose** problem?" (Problems always arrive at your door on two feet.)
- 3. Forget what you "know".**
 - Many people mistake a solution method for a problem definition. That is they define the problem by a known method of solution.

Red - Doer

The part of your personality that helps you take action and get things done.

Green - Thinker

The part of your personality that helps you plan and analyze information.



Yellow - Socializer

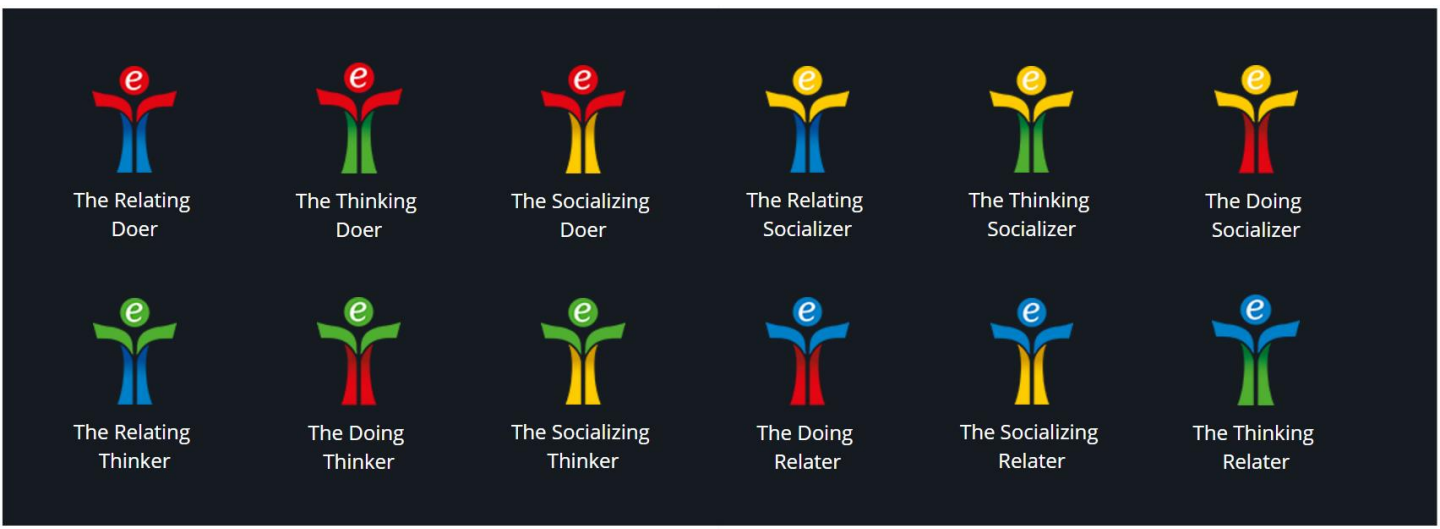
The part of your personality that helps you interact and engage with others.

Blue - Relater

The part of your personality that helps you empathize with and support others.

In order to identify the right problem you must start with communication. You can achieve this through harnessing the understanding of both personality and character. This understanding enhances problem solving, which elevates performance and effectiveness.

At [STONEWALL](#) we use a tool called [EQUILIBRIA](#) to discover our E-Colors. This helps us identify our different personalities and better communicate with our customers.



Want to know more?

Do you want to have better team communication?
Click the link below to get started!

[LEARN MORE](#)





CHAPTER FOUR

Fail Fast



Why do we always start with the solution? Why wouldn't we attempt failure first?

When did we decide failure was a bad thing?

Lessons Learned from Failure

How can you apply these concepts to problem solving?

- **Lesson #1: Experience**

- The first important lesson gained from failure is experience.
- What happens when we fail? When we go through something and can walk away with firsthand experience, it helps us to develop a deeper understanding for life.
- The experience of failing at something is truly invaluable. It completely alters our frame-of-mind through the induction of pain. It makes us reflect on the real nature of things and their importance in our lives, transforming and improving our future-selves.

- **Lesson #2: Knowledge**

- Failure brings with it important firsthand knowledge. That knowledge can be harnessed in the future to overcome that very failure that inflicted so much pain in the first place. Nothing can replace the knowledge gained from failure.
- When Thomas Edison famously failed nearly 10,000 times to create a commercially viable electric lightbulb, with each failure, he gained the knowledge of just one more avenue that didn't work. It was the accumulated knowledge developed from nearly 10,000 failed attempts that ultimately led to his success.

- **Lesson #3: Resilience**

- Failing in life helps to build resilience. The more we fail, the more resilient we become.
- In order to achieve great success, we must know resilience. Because, if we think that we're going to succeed on the first try, or even the first few tries, then we're sure to set ourselves up for a far more painful failure.
- The characteristic of resilience can help us in so many ways in life. Resilience helps to breed success by setting the game up to win. Gone are the lofty expectations that thing will happen overnight, and in comes the expectations that true success will take an enormous amount of work and effort.

Failure Continued

- **Lesson #4: Growth**

- When we fail, we grow and mature as human beings. We reach deeper meanings and understandings about our lives and why we're doing the things that we're doing. This helps us to reflect and take things into perspective, developing meaning from painful situations.
- Life is designed for us to grow and improve. From the very genetic fibers that make us into who we are as individual persons, into the fabric of society on a global scale, growth is a fundamental part of us. Without growth, we couldn't improve life on every front.

- **Lesson #5: Value**

- One of the biggest lessons that we can learn from life's failures is the necessity to create and spread an exceedingly high amount of value. In fact, value lies at the heart of success and a lack of value is a fundamental pillar to failure.
- In thinking about your past failures, think about how much value you brought to the table. Could you have offered more value? Would that have prevented failure? When you learn to create immense value, and do so consistently, you will eventually succeed.

How to Fail Fast

1. Try to kill the idea first

- We all believe that our idea is the next multimillion dollar idea. We can all convince ourselves, and others, of how great it is. BUT, how many of us would be better off if we did the opposite?
- If your idea/solution is a survivor of your death plan, then let that be the idea you stick with!

2. Lower the costs of testing.

- Running tests need not be expensive. There are tons of low cost ways to test critical assumptions. Get out of your comfort zone!

3. Change the order of experiments.

- Many companies spend a lot of money answering the wrong questions. They'll seek to perfect a technology without understanding whether there's a market need. Assess strategic risks first, because they are often what sink an idea.

4. Increase the pace of decision making.

- Entrepreneurs with clearly bad ideas typically don't have the luxury of spending money on those ideas for too long. Companies, however, can let bad ideas linger for inordinate amounts of time because of slow decision-making processes. Shutting down flawed projects early avoids needless spending — and focuses resources on the best ideas.

5. Be willing to let go of your baby and accept the learning.

- We all put a lot of time and effort into our ideas and dreams. Maybe the idea/dream was meant for your learning so you could be great at the next one. Accepting this can save you a lot of heartache and money.



CHAPTER FIVE

Don't Be So Scared



Get out of your comfort zone!

Being in your comfort zone eliminates the need for thinking.

What is a comfort zone?

- We all have one, especially risk adverse engineers. It refers to certain habitual, comfortable, familiar ways of thinking, feeling, seeing, acting and reacting.

Why is this an obstacle?

- Well, if your comfort zone is going to provide the infrastructure for real achievement, no problem. But not even superior athletes imagine they can compete unless they suffer the pain of staying in condition or competition.
- If your competitor is better prepared, in better shape, more competent, and better informed than you are, it may be that your enemy is not your competitor, but your own comfort zone is.

Thought Prodders

1. Whether or not you have what it takes to lead yourself depends upon how dissatisfied you are with yourself. Are you dissatisfied with your comfort zone?
2. If you crave or pursue comfort, you are on the wrong path.
3. The more maintenance you require from others, the less likely it is that you can become an achiever.
4. The reason why most people can't think out of the box *is* that their box is their comfort zone.

Life

BEGINS

AAAAAAAAAAAAAAAAAAAAAAAA

at the

·E·N·D·

of your

COMFORT

- ZONE -

- Neale Donald Walsch



Want to know more about StoneWall?

Click the link below check out who we are and
what we do!

[Watch Our Video](#)

