Preface

Does it feel like you've been spending more time solving problems than expanding your business? Does the same problem, or a similar one, trouble you again and again? Do scenarios like these sound familiar? If so, then this book is for you.

- A system upgrade isn't completed on time. Help desk technicians can't look up customer records.
- Shipments to customers are late. Everybody wastes time trying to figure out when the shipment will really occur.
- Engineers arrive at a customer site to install new equipment, but can't complete the work. The site isn't ready, and the shipment is missing essential parts.
- Your customer says your new product doesn't work; you think they don't know how to operate it properly.
- Sales reps can't seem to give customers quotes that include everything needed and have the correct price. Purchase Orders require a research effort to figure out what the customer is trying to order.

Problems like these waste the most precious resources you and your customers have: time, people, and money. Failed attempts to solve the problem result in an even bigger mess as costs rise along with tempers. Common pitfalls include making unconfirmed assumptions about what the problem really is, never addressing the correct root causes, choosing ineffective or partial solutions, and never fully executing the corrective actions. Any of these results in recurring problems.

Solving Problems Permanently℠ (*SPP*) is a special method to help individuals and teams resolve these difficult situations that anger and frustrate everyone involved. In *When Stuff Happens*, I explain the techniques I've developed in years of helping consulting clients and students solve these ugly problems. Rather than a general tool box, *SPP* is an integrated approach to problem solving. I show how to use specific tools in the context of the problem solving process so you can focus your energy on the problem, its causes and, most importantly, its solution.

This practical guide leads the reader through solving a problem from start to finish. You will learn to

- Define a problem clearly,
- Organize your problem solving project,
- Analyze the problem to identify the root causes,
- Solve the problem by taking corrective action, and
- Prove the problem is really solved by measuring the results.

SPP uses specially selected standard tools and provides a means and structure to apply them. The combination

of step-by-step instructions, templates, and checklists makes it easy for the problem solver to

- Resolve problems more quickly when they occur,
- Prevent future problems,
- Reduce finger-pointing and blaming,
- Assign responsibility for specific corrective action, and
- Understand clearly "who does what to whom" to make things happen in their work environment.

Your end result from using *SPP* is improved productivity for everyone who is affected by the problem. The impact touches not only you but also your customers and their end users.

Let me know how these methods work for you, what improvements you discover and what results you achieve!

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Getting Started

What is *Solving Problems Permanently*[SM]?

Solving Problems Permanently[SM] or *SPP* is a basic set of procedures and tools you can use to solve complicated problems quickly and effectively, especially those that occur in today's high-tech business environment. *SPP* centers around standard root cause analysis (RCA) techniques, expanded to cover the entire problem solving process.

Complicated problems are really systems of interrelated problems, or *messes*. You solve a mess by using *SPP* methods to untangle it. Regular trouble-shooting techniques don't work very well. These systems of interconnected problems typically include multiple technical problems as well as business and political issues, involve multiple companies, and increasingly are worldwide in scope.

You can use *SPP* to solve problems by yourself, but the techniques are especially designed to help a team be effective. Messes have many tangled strands: multiple

technical problems, business and political issues, the concerns of more than one company, considerations resulting from international scope, etc. A team can often unravel these best because the members can bring a wide variety of experience and perspective to the table.

How to Use This Book

If you're reading this book, you may already be ensnared in a mess that needs an immediate solution. It's been designed for you to work on your problem as you read: start applying the steps to your problem as you go.

Each step begins with an explanation of the procedures and tools you'll use for that step in solving your problem. The general explanation includes hints and things to watch out for. Flow charts are used to diagram the procedures and to help keep track of which step you're on. The *Solving Problems Permanently*℠ Process Flow shows the overall process. Additional charts show the details within the steps of the overall process. All of the charts are coded: a box with a heavy border indicates the step you are about to do, while a box shaded gray indicates a completed step.

Two case studies are included to help you understand how to apply *SPP* to a problem and to show what the results of each step should be. Read the examples to follow the *SPP* process. Then comes a section called "Do It For Real." This section is a specific guide to lead you through the work on your own, real problem.

Of course you can read ahead if you want a preview of where we're going, but don't let reading delay you

from tackling an important problem right now. Go on to the next step when you've finished the current step—or think you have.

You'll probably find that you have to back up sometimes and repeat a step. That's a normal part of the problem solving process: as you learn more about the problem and its causes, you'll find you need to rethink earlier ideas.

The Appendix has some tools you can use to make problem solving easier. These include a worksheet template and a checklist to help you verify that you've really completed everything. There is also a glossary of special terms and a reading list.

The Case Studies

Two case studies will be followed through the book to demonstrate how to apply *SPP* to a problem and to show what your documentation might look like as you proceed through the *SPP* process. Both are based on real problems that occurred in companies similar to the ones described. The first is a situation in a small manufacturing company; the second, in a large, multi-state telephone company.

Case 1: On-time Shipping Problem.

Clean Room Furnishings (CRF) is a small manufacturing company with about 70 employees. CRF makes stainless steel tables, carts and other equipment for clean rooms where near-perfect elimination of environmental contaminants is required. Although most orders are for standard products, many require custom products that

are designed and built to meet particular customer specifications.

Late shipments can be very expensive for CRF's customers, who have been increasingly vocal about how frequently this has been occurring. These customer complaints prompt the President to tell you, the Operations Director, to "fix the problem." It's November 1 when this happens.

Case 2: On-time Software Installation Problem.

BigTel, which provides telephone services for a multistate region, has just installed a major new application for directory assistance. It has a number of features that will make it easier and faster for the operators to find listings—but only if it's working.

Directory assistance is provided to customers twenty-four hours a day, seven days a week. However, it is much less busy at night, so changes are generally installed then. All systems are supposed to be back in full production by 6:00 A.M. when call volume starts to increase, and preferably earlier.

If the application is not available or does not function correctly, operators cannot find listings for customers, who are likely to complain to senior executives at BigTel as well as to the Public Utilities Commission. Of course, the unhappiness will also be reflected in the customer satisfaction survey. The Commission considers survey results in deciding whether to approve rate increases, and BigTel is about to ask for one. Also, BigTel awards executive bonuses based on customer satisfaction.

BigTel has purchased the system from a software company called DA Systems (DAS), which is also providing the hardware and acting as the system integrator for this installation. BigTel has never used this type of computer system network before. The network includes five mainframe systems located in four states with thousands of operator workstations.

BigTel has identified a recurring problem that is undermining the ability of their operators to provide excellent service. Whenever new software releases are installed, something always seems to go wrong, and the system is rarely back in production by the announced time. When the system is down, calls cannot be satisfied, which is frustrating to customers and operators alike. BigTel has been declaring that they cannot afford this problem, and the site managers have discussed it with DAS at the weekly status meeting, but nothing has changed.

HINT: Whatever you do, do it on purpose.
Doing nothing is a wimpy way to decide not to solve the problem. It's healthier for your career to

- Decide consciously if you'll tackle a particular problem,
- Know why you made your decision, and
- Be able to explain it.

The worst event ever occurred last week. DAS installed a major new software release that included some key new features along with some important bug fixes. At the same time they

increased the disk storage on one of the systems. Everything seemed to be going smoothly at first, but then the problems started. The system was not back in production until noon—six hours late!

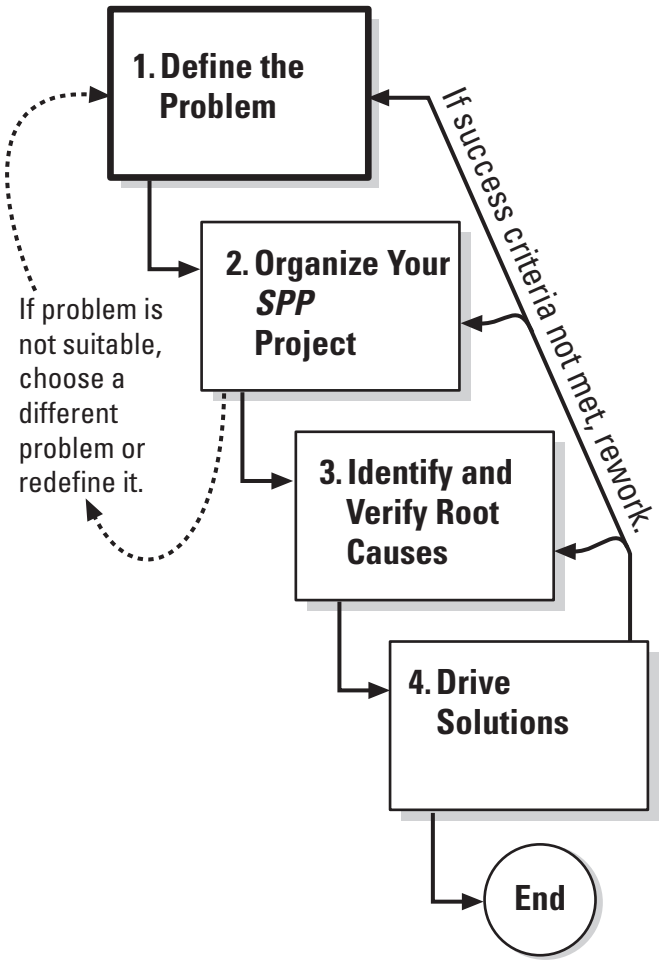
The Senior Vice President of the Operator Services Division has assigned you to make sure such a fiasco doesn't happen again.

The *SPP* Process

You'll use the *SPP* process every time you have a problem that's neither simple nor obvious. If it's a burned out lightbulb, change it—but also be sure that's really all it is or you'll be changing bulbs again very soon.

As you follow the steps, you may also discover that the problem is not important enough to be worth investing such an intense effort, or you may identify other reasons to stop working on it. *SPP* is designed to help you determine early in the problem solving effort if you're wasting your time and should move on to something else. By deciding explicitly, you make sure you solve the problems that are most urgent and aren't distracted by the ones that are less important.

Solving a problem always requires that you complete all the steps in *SPP*. It's often necessary to revisit steps as you understand the problem better. The following flow chart represents the basic steps you'll follow.



Solving Problems Permanently℠ Process Flow

Define the Problem

The first and most important step in the *SPP* process is creating a *problem statement*, the written definition of your problem. This helps you be sure you understand exactly what the problem is—and that the whole team is understanding it the same way. In addition, the problem statement determines everything else you'll do (or not do).

Writing the problem down forces you to describe it carefully, completely and unambiguously. The statement is a valuable tool to help focus your team on the real problem and avoid wasting time on extraneous issues.

The written statement is also used as a "sales tool" to explain what problem you're solving and why it's important. You use it to make sure you have the support you'll need from your manager, customer and any other key players. This is especially important if the significance of the problem is not universally understood.

The *problem worksheet* is a tool for creating well-structured problem statements and includes the following sections:

- Problem Description
- Sponsor
- Analyst
- Success Criteria
- Key Characteristics
- Risks, Vulnerabilities and Dependencies.

It's easiest to write the problem statement starting with the Problem Description. Then work back and forth among the sections until you're satisfied that the statement really describes the problem. Don't panic: the whole thing should be only one or two pages long, and you're not writing poetry. The goal is clarity rather than creativity.

HINT: The problem statement should be self-explanatory. Someone should be able to read the problem statement and, with no other information, understand what problem you're going to solve.

You may need to collect additional information about the problem to be able to complete the worksheet. A typical approach is to make a preliminary draft to sort out your ideas and figure out what you don't know. Then do whatever investigation is necessary to be sure you understand the problem thoroughly. Finally, revise the worksheet until it states clearly what the problem is.

The investigation could include interviewing participants, collecting measurements, creating flowcharts of

what happened, etc. The purpose is to make sure your worksheet accurately identifies and describes the real problem.

You are ready to go on to the next chapter when everybody who reads your problem statement, including you, understands what will be different when the problem is solved, and your team agrees that it describes the correct problem. In some cases you may even want a formal sign-off from the problem sponsor and your manager before you proceed.

The remainder of this chapter will walk you through completing each section of the worksheet using the template shown below. We'll follow the two case studies as examples of how to build the worksheet. Then the "Do It For Real" section will guide you through creating a worksheet for your own problem.

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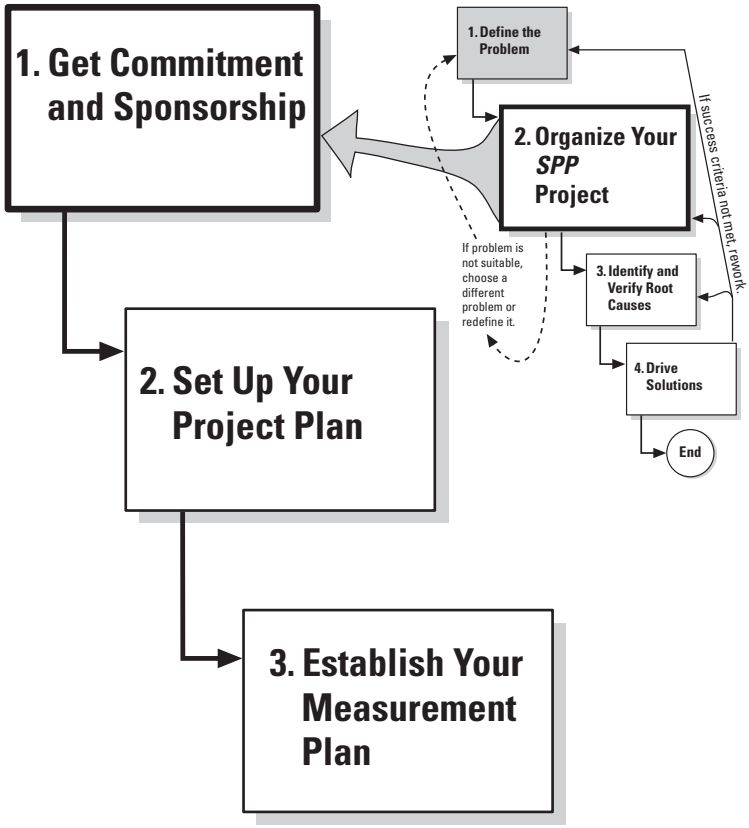

Organizing Your Project Process Flow

Organize Your *Solving Problems Permanently*[SM] Project

You now have a completed problem worksheet for the problem you're planning to solve. "Completed" at this point means

HINT: You're still not ready to investigate, or even think about, how you will solve your problem!

1. You think it describes the problem completely and accurately, and

2. You are satisfied that everyone who reads it will understand correctly what will be different when you finish solving the problem.

If you have a team working with you, they agree. Now you will use the problem statement to answer some key questions that will determine whether you can (and should) go ahead and solve the problem. The steps are shown in the Organizing Your Project Process Flow diagram.

Get Commitment and Sponsorship

Organizing Your Project Process Segment

Analyzing and solving messy problems is a lot of work, so make sure it's worth it. Decide explicitly whether to proceed by answering the following questions:

- Is it **important**? Be sure the impact of the problem is high enough to justify investing the resources it will take to fix it. Look especially carefully at the risks section of your worksheet. How bad will it be if you don't fix the problem? If it is not clear to you and everyone else involved whether you should go ahead, you need to do more work.

> *We have to learn to distinguish those things that are truly important from those that are merely urgent.*
> — Jerry D. Campbell
>
> Just because a problem is there does not mean you have to fix it.

Quantify the cost of the problem as realistically as you can. Include lost opportunity costs as well as real expenses such as staff time to deal with the problem, travel expenses, etc. Revise your problem worksheet to include this information. Then

guesstimate what it will cost to analyze and fix it.

If it will cost more to fix than to live with the problem, or if the numbers are even close, perhaps your resources (time, people, money) are better spent on other projects. On the other hand, if you can demonstrate that the cost of the problem is much higher than the cost of solving it, using estimates based on reasonable assumptions, it should be relatively easy to get the resources you need.

- Is the problem a **mess**? Reread your problem statement, especially the problem description and the key characteristics. If it's a mess, use *SPP*.
- Is it **well defined** and **small enough** to be manageable? Reread the problem description and the success criteria. The scope of your work must be clear before you can begin analyzing the problem.

  If the mess is so big you can't see the boundaries, you need to find ways of breaking it up into smaller chunks. Solve part of the problem at a time. For example, if it involves a multi-vendor network, perhaps you can limit the initial effort to the products of one or two vendors or start with two key sites. Look at the larger environment after you understand the smaller.
- Can you get the necessary **commitment** to do the project, or at least get started? If you haven't already done it, now is the time to be sure the sponsor accepts the job. If nobody with the power to be effective is willing to be the sponsor, your chances of success are remote.

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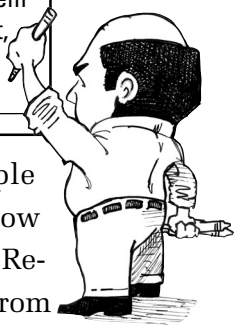
Identify and Verify Root Causes

You now have an approved problem statement that defines your problem, and you're organized to manage your problem solving project. The problem statement tells you *what;* the root cause analysis (RCA) will tell you *why*. You're ready to find out specifically what causes your problem. Only after you know that can you start to consider solutions.

"Stuff" doesn't just happen. Some condition, previous event or prior action causes a problem to occur. In the RCA step of *SPP*, you'll systematically analyze the problem to identify the root causes. Since the problem is a mess, there will usually be multiple causes. When you know the causes, you know where to focus action to eliminate them. Removing the causes prevents the problem from occurring again.

The Root Cause Analysis step tells *why* the problem occurs. If you know that, you can fix the problem permanently.



There are many different RCA techniques, each effective for different types of problems and different situations. This book presents only one of them, Ishikawa Analysis, as the core of the RCA step because it is an effective general-purpose method that is relatively quick and easy to use. You can use another method if you prefer, but it should be systematic and aimed at identifying the root causes of your problem.

Invented by Kaoru Ishikawa in 1943, Ishikawa Analysis is also referred to as Cause-and-Effect Analysis or Fishbone Analysis. Regardless of its name, Ishikawa Analysis is a group process that relies on synergy and collective knowledge to develop a comprehensive list of possible root causes. If you've used Ishikawa Analysis before, you'll notice that *SPP* adds some special steps to make it easier and quicker.

What You Get From Ishikawa Analysis

Ishikawa Analysis is a structured but relatively informal RCA technique. It helps you organize a brainstorm session to get a particular result, specifically a diagram that shows categorized groups of possible root causes. You can then verify the causes, set priorities and develop an action plan to eliminate the significant ones.

> *Cause-and-effect diagrams are drawn to clearly illustrate the various causes affecting product quality by sorting out and relating the causes. Therefore, a good cause-and-effect diagram is one that fits the purpose, and there is no definite form.*
>
> —Kaoru Ishikawa

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Drive Solutions

This is where everything gets tied together and you start to get results. Because you've verified the causes, you know why your problem occurs. Because you've assessed their impact, you can now focus on and eliminate the important causes, or at least minimize the chances of them occurring. The time you've invested in preparing will now pay off with effective solutions that really will solve the problem.

Develop and Execute Action Plans

You've already started keeping a task list for everything you and your team are doing to make the problem solving project happen. The task list also includes your contingency plans to make sure the vulnerabilities and dependencies don't prevent you from achieving your success criteria.

Now you're going to add the tasks that will actually solve the problem. You'll create an action plan for each cause that you've identified as important enough to address. Add the tasks that make up each cause's action plan to your task list so you can manage them.

Choose the Best Approach

Take the causes one at a time. For each, decide how you will eliminate that cause. In many cases, you will be able to decide with a short discussion. If the best choice is not obvious, start by brainstorming alternative approaches. Then build an assessment matrix to help you decide.

Using an Assessment Matrix

Draw a table, as shown below, with a row for each possible approach in the left column. Make two columns for ratings as shown, and a final column for the score.

Options	Impact	Achievability	Score
Approach A			
Approach B			

Assessment Matrix Template

Assess how likely each approach is to eliminate the cause by rating its impact on a one to five scale, where one is low and five is high. Now assess how achievable the approach is, considering how difficult, expensive and time-consuming it will be to carry out the strategy. One is difficult, five is easy.

The team can determine ratings either by consensus or by averaging individual ratings. To use consensus, discuss the approaches one at a time, first addressing impact and then achievability. Keep talking until the team agrees on the rating. If opinion stays divided or if the list is long, it may be quicker for individuals to fill out the

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