Editor's corner

Finding bugs quickly and reducing wasted time

Many organizations calculate that 25-75% of their resources are spent on product rework. This rework contributes to the company's loss in profits. The product defects contribute every day to the company's image in the market place.

Inspections are team-based peer reviews that have been used in industry for 27 years to successfully address these problems.

In our inspection class, students come with a variety of documents and code to inspect. On their first attempt, students typically observe the following results:

* 37 critical or major defects per Thousand Lines of Non-commented Source Code (KLOC).

* 3.3 critical or major defects per effort-hour expended in the inspection process. In comparison, testing typically finds 0.3 defects per effort-hour expended in test.

* 4 critical or major defects per page for designs, plans and specifications.

When teams inspect code, 57% of them find, on average, between 6 and 12 critical defects per KLOC. In many cases, the code has already been tested and shipped. Critical defects include memory leaks, incorrect variable names, logic errors, and wrong path names. These defects are difficult to find in test.

Inspection can be performed on all software work products. Here are some selection criteria to narrow your focus:

• The most critical section

Goal

Improvement actions

Problem areas

Common result —lost in the trees

You are here
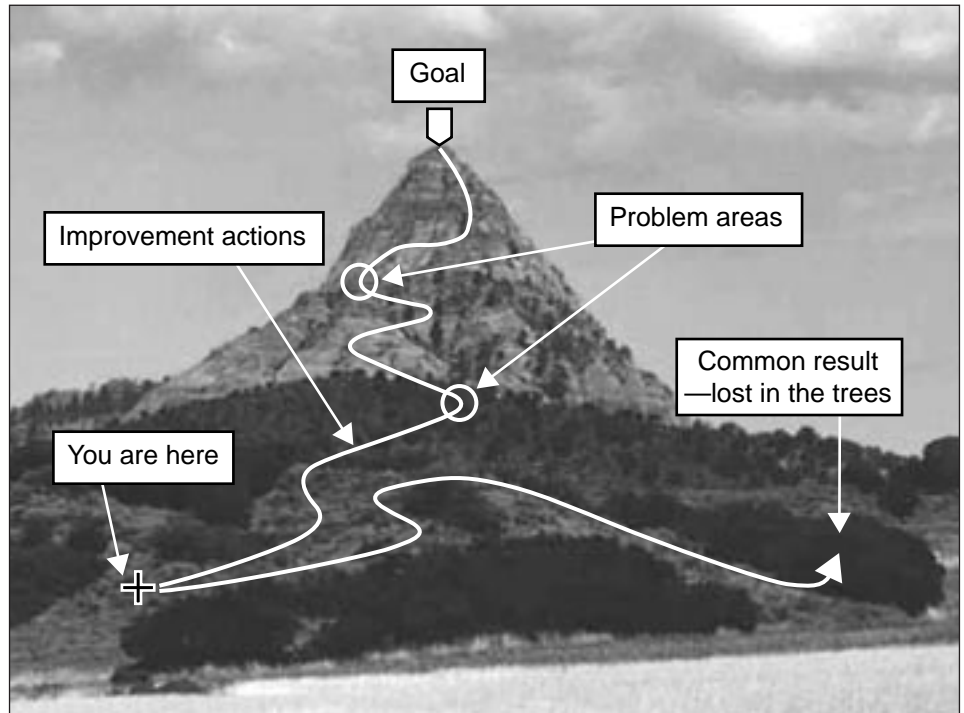
A goal-problem approach for scoping an improvement program

by Neil Potter

Introduction.

The most common approach for process improvement that Mary and I have seen during the last 10 years is for an organization to document all processes. We don't know exactly why people do this, but they do.

This approach is amplified when an organization rushes to adopt a sweeping solution such as ISO9001 or the SEI CMM . In the light of a goal stating, "Be SEI CMM Level 3 by December," the approach of documenting all processes is reinforced, and might even appear natural. In the picture above, the lower white line describes this approach. It starts, wanders around and ends, without reaching any specific goal.

An alternative approach.

In the picture, one of the business goals an organization is trying to achieve has been highlighted. Examples might include the delivery of a product, the completion of a software installation, or the upgrade of a database. The goal could also be the desired outcome when a critical problem has been solved. For example, a critical problem might be the inability to hit delivery deadlines, or the fact that 75% of the organization's resources is spent on rework. Related goals might be to meet deadlines 100% of the time, or reduce rework to 25%.

The goal-problem approach starts with a business goal and works backward to determine what improvement actions are necessary to achieve that goal. Here is an example.

The Process Group offers services to help you succeed

❏ **Identify critical changes to improve organizational results. Benchmark against the CMM.**

A software process assessment examines your organization's software practices and generates a focused list of the critical areas for improvement with consensus from the managers and engineers. Our lead assessors are authorized by the SEI to conduct a CMM-based Appraisal for Internal Process Improvement (CBA IPI). We can also conduct an analysis that is customized to meet your specific needs.

❏ **Meet project deadlines, reduce risks, manage expectations, and get the project team on the same page.**

In this three-day Software Project Planning and Management Training class, project managers and their teams learn how to meet deadlines through better estimation, reduce surprises using risk management, schedule work for better optimization, understand and negotiate project trade-offs, and track progress.

❏ **Meet project deadlines. Scope and estimate project work.**

This one-day Software Estimation Training class is a subset of the three-day Software Project Planning and Management class. It helps project managers and their teams develop more accurate schedule estimates.

❏ **Avoid schedule delays caused by needless product rework. Significantly reduce maintenance costs.**

This two-day Inspection Training (Peer Reviews) class teaches teams (engineers and managers) to efficiently find defects in their work (documentation and code) and eliminate the personality conflicts and inefficiencies of walk-throughs.

❏ **Lead your organization in meaningful improvement.**

This two-day Software Engineering Process Improvement Training class provides a systematic approach for organizations to improve their software development capability, resulting in higher product quality and reduced costs. It includes: getting management support, focusing the organization on the critical issues, planning the improvement, and effecting organizational change.

❏ **Understand what a CMM assessor looks for. Learn the practical use of the CMM. Perform a mini CMM gap-analysis.**

The following CMM workshops are available:

- SEI Level 2 - The Nitty-gritty (One-day class)
- SEI Level 3 - The Nitty-gritty (Two-day class)
- SEI Level 4 - The Nitty-gritty (One-day class)

❏ **Tailored assistance.**

This service consists of customized coaching on your specific problems, (e.g., meeting deadlines, product quality, improvement progress and cultural change.)

❏ **Speaking engagements.**

Customized presentations on the above topics can be provided.

❏ **Audio cassettes:**

* The Role and Focus of a Software Engineering Process Group
* Making Change Happen - a 10-Piece Tool Box

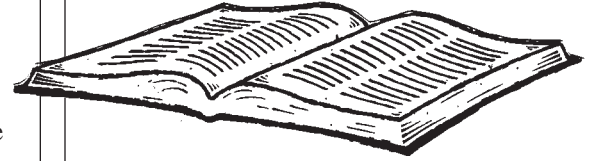*All services are available on-site and include unlimited telephone/email support.*

A train-the-trainer program is available for the Inspection, Project Planning and Estimation classes.

Call 972-418-9541 or E-mail help@processgroup.com for class descriptions or visit our Web site, www.processgroup.com

Please send us your e-mail address if you would rather receive the next issue electronically.

Management Role:
Ensuring that Improvement Sticks

by Mary Sakry

Without leadership, good improvement efforts usually derail and fail. As a manager, you can help keep the efforts on track by providing a clear focus for the improvement, by letting people know what is expected of them, and by aligning your behavior with the improvement.

Focus.

The first step in encouraging good process improvement is to make sure that people stay focused on the organization's goals. When people know what is expected of them, it is a lot easier for them to make appropriate choices. For example, if they know that meeting a product delivery deadline is most important, then any improvements that can help them meet deadlines will more likely be adopted.

To help your organization stay focused, it is important for you to remain informed about the planned improvements and help people see how the new practices support the organizational goals. For each new or improved practice you need to understand:

- What the practice is supposed to accomplish
- Why it is needed (what problem it is fixing, or what goal it is supporting)
- How and when it should be used
- How to support it to help ensure its success

Communicating expectations.

You will then need to convey this information to your people. For example, when introducing a new estimation process, the information presented could describe:

- What the practice is supposed to accomplish

  – e.g., this estimation process can be used to estimate any kind of project, provide a detailed task list, clarify project assumptions and build consensus among the participants of the project.

- Why it is needed

  – e.g., to help meet current deadlines, correctly scope the project, increase schedule predictability, and reduce cost overruns.

- How and when it should be used –e.g.,

  - At the start of a project or phase

  - When there is a change in requirements

  - For projects (or sections of a project) where there is no good historical data

  - When many opinions exist about the project scope and what is involved

  - For high-risk sections of the project that require more thorough evaluation

When supporting a new estimation process, you can try several things to help make it successful –e.g.,

  - Require project teams to prepare estimates prior to performing project work

  - Provide time in the current schedule to perform the estimation process (as little as one-half day)

  - Require the recording of estimates to build an historical database

  - Use the estimation process for your work

Your behaviors.

It is essential to change your behaviors to support the new practice(s). If people see you using the new method, or asking for the results of the new method, then they know you are serious. If a Vice President plans his or her work using the standard planning process, this sends a strong message about the serious nature of the improvement effort and the validity of the method.

For example, you could:

- Use the new risk management process for your work

- Inspect your work using the new inspection or peer review process

- Use a tailored version of the new requirements elicitation method to understand the requirements of your customers (the developers and managers)

  - Collect the desired metrics (or equivalent ones) for your own work and show how they are used

In summary, your support must be active and visible. You must help your people stay focused on what is important and make sure everyone (including you) sees the tie between those goals and the new practices. Ask them to use the practices and require them to show you the results. Be sure to use those same techniques for your own work. (Some of our clients refer to this as "eating your own dog food".)

Editor's corner
(Continued from page 1)

- The most used section in the product
- The most costly section if defects were to exist
- The most error-prone section
- The least well known section
- The most frequently changed section

If you would like to learn more about inspection, please call us or look at www.processgroup.com.

Neil Potter

The Process Group

Mailing address: The Process Group
　　　　　　　　P.O. Box 700012
　　　　　　　　Dallas, TX 75370

Telephone number: 972-418-9541

Fax number: 972-618-6283

E-mail: help@processgroup.com
Web: //www.processgroup.com

A goal-problem approach

(Continued from page 1)

During a client visit to help plan a process improvement program, I learned that the group was about to establish six teams to work on the six Key Process Areas of the CMM Level 2. I suggested that the developers and managers temporarily forget about Level 2 and state all the major problems they had. Then they were asked to state the goals they were trying to achieve over the next six to 18 months. After one hour of discussion, they created a list of 23 items. A sample is shown in figure 1.

The next step was to have the group compare the list of problems and goals with the topics of the CMM. In figure 1, I have listed the related KPA names and activities in parenthesis after each item.

What was the scope of the improvement program?

The scope of the improvement program was to address the problems and the goals of the organization. Twenty-one out of the 23 items (91%) map to Level 2. When all the problems and goals have been addressed, 46% of the Level 2 activities will have been addressed.

The key difference between this approach and addressing the six KPAs in parallel is that the problems and goals tell you which pieces of each KPA to address first. Regardless of the improvement model or standard being used, the problem-goal approach tells you how to scope and sequence your improvement program.

Dealing with items that don't match the improvement model or standard.

In figure 1, not all of the problems in the list closely match the areas of CMM Level 2. For example, there is not much in the CMM to address goal #4 specifically. In this situation, one has to determine which areas are the most important for the organization to fix now. Serious problems should be worked on first.

What can be learned using this approach?

Three significant lessons can be learned from adopting the goal-problem approach:

1. The problems and goals help the organization identify which pieces of a process improvement model or standard to work on first. A model or standard should no longer be seen as providing an all-or-nothing approach, which often leads people to do everything at once, regardless of whether it is appropriate.

2. Any process document that is developed to solve a problem will be meaningful and useful. The process improvement team will be less tempted to gold-plate the process, since its scope will be defined by a problem or goal.

3. The motivation of the group to work on improvement issues will be increased. The improvements will be directed toward improving the group's ability to produce software. Barriers to success will be solved systematically.

Addressing all of the items in the model or standard.

One of the initial concerns that people have with this approach is that an organization will not address all the items in the model or standard being used, since there might not be goals or problems related to each item.

When the first set of problems and goals have been worked, the next step is to repeat the cycle and determine the next set of problems and goals. This new set can then be compared to the remaining items in the improvement model or standard.

There will, of course, be situations where a few of the items of the model or standard are not used when solving a problem or achieving a goal. These items should be left until the end of the improvement cycle. At that time, one of three scenarios occurs. First, the outstanding items will be put to good use. It will become clear how to use them effectively. Second, the items will be declared 'Not applicable'. Third, the items will be performed academically to meet the letter of the law. The focus should, of course, be on the first scenario.

In conclusion, improvement should be focused on business goals and problems. The use of improvement models should be dictated by these needs.

Problems
1. Get better requirements. Requirements tracking not in place — changes to requirements are not tracked; code does not match spec. at test time. *[Level 2: RM - activities 1, 2, 3]*
2. Management direction unclear for product version 2.3. Goals change often. *[Level 2: RM - activities 1, 3, verification 1]*
3. Hard to revise project plan - items drop off, new things get added, plan is out of date. *[Level 2: SPTO - activity 2, 8, 9]*
4. Wrong files (e.g., DLLs) get put on CD - don't know what the right ones should be. *[Level 2: SCM - activities 4, 7, 8, 9, 10]*
5. Defect repairs break essential product features. *[Level 2: SCM - activities 5, 7, 6, 9, 10, abilities 1, 2, 4, 5, verification 3, 4]*
6. Customers are unhappy. There are approximately 300 outstanding defects that have not been addressed. *[Level 2: SCM - verification 1, RM - activity 3; Level 3: IC - activity 1]*

Goals
1. Understand what our capacity is — develop one list of all the work we have to do. *[Level 2: SPP - activity 7, ability 1].*
2. Improve schedule tracking and communication of changes to impacted groups. *[Level 2: SPTO - activities 3, 4].*
3. Successfully deliver Tracking product. *[Level 2: RM - activities 1, 2, 3, SPP - activities 10, 6, 13].*
4. Improve performance of mainline software product. *[Level 2: SPP - activity 11, SPTO - activity 7].*
5. Keep making a profit. Keep customers happy. *[Level 2: RM - activities 1, 2, SPP - activities 10, 12, 13, SPTO - activities 4, 6, 8, 10, SQA - activity 5, Level 3: SPE - activities 2, 7, IC - activity 1, PR - goal 2]*

Figure 1.
A sample from the 23 problems and goals