Software is everywhere and continues to take a more important role in our everyday lives. As new development methods come in to use and competitive pressures mount, software quality becomes paramount as a means to compete and differentiate. Even, industries such as construction and heavy machinery, once completely in the manual control arena, are increasingly being controlled by software. The companies that make these machines aren’t software companies and the transition to being heavily dependent on software has not been easy. These companies and many others recognize that testing processes have a direct impact on their software quality, and work with XBOSoft to assess the quality of their testing processes and come up with a plan to improve them.

XBOSoft’s test process improvement methodology assesses 16 key process areas and for each area, determines the current situation and a roadmap for improvement. One Key Area is Metrics: what metrics are you using to manage and improve your software quality. For each Key Area, there are 8-11 Checkpoints with corresponding 8-11 Pass/Fail criteria.

For example, the first Metrics checkpoint is “In the test process, metrics are defined and used to estimate and control the test project.” If it is shown that the development organization has defined their Metrics, then the first Checkpoint is Passed. There are 8 more Checkpoints concerning Metrics. As more and more Checkpoints are Passed, the organization moves from Ad-hoc → Controlled → Efficient → Optimized. The Maturity Matrix shows at a glance the state of testing processes and at what level of maturity they are.

“Testing processes have a direct impact on the Software Quality.”
For Example, the Key Area, Metrics, has 9 Checkpoints. If the first 3 checkpoints are Passed, then this Key Area is Controlled. If the next 4 Checkpoints are Passed, then this Key Area is considered Efficient, and so on.

After an assessment has been made of the organization, the Maturity Matrix provides a clear picture of what needs to be done to bring the Test Processes to a Controlled state, and then to an Efficient level and finally to an Optimized level.

**Case Study 1 – Heavy Construction Equipment**

Company A builds heavy construction machinery. Software using lasers and GPS now handles most of the positioning of the equipment, whereas before, it was done manually by sight. This software greatly improves the speed and accuracy of the equipment. However, defects in the software can direct the equipment to execute dangerous maneuvers.

A test process assessment was performed by XBOSoft with the following results.
This company only passed 49% of their Checkpoints. Their Software and Test Processes were not very well controlled. The Maturity Matrix revealed at a glance those areas which needed to be improved and TPI provides a plan for what needs to be done.

1) Key Area 1, Checkpoint 4, shows that Company A did no Risk Analysis. This is critical so that everyone concentrates on what is most important first. Since it is impossible to test everything, the testers could easily miss something that could cause serious problems because they end up testing unimportant things first and run out of time for more important things.

2) Company A had no Metrics to measure the Time, Cost or Quality of their product or processes. How many defects were found in production and what was their severity? How much time was spent on fixing defects relative to overall development time? How much did it cost to fix a defect in the field? Without adequate metrics, the reports were of little value. Management didn’t use the reports they had and only had a vague idea of the effectiveness of their QA team. A comprehensive set of Metrics and an effective list of Reports were recommended and implemented.

3) Test Strategy, Test organization and Test Process Management needed improvement. Entrance and Exit Criteria were defined for each testing level which gave the testing process a consistency previously lacking. Testware were brought under Configuration management so that the Product Managers, the Software Developers and the QA testers were using the same documents. So when changes were made, everyone was on the same page.

Company A is currently in the process of bringing their organization up to a Controlled Level. A detailed document was put together by XBOSoft to improve their processes in a systematic, step-by-step plan. A quality product is the goal; a step-wise and continuous process is the means to achieve that goal.

When Company A completes their improvement plan, they have already planned to do another test process assessment to see if they have indeed progressed to the Controlled Level. And then they plan to proceed to the Efficient Level.

Case Study 2 – Oil Exploration Equipment

Company B builds oil exploration equipment. They provide seismic imaging to map the topology of the underground geology, for the purpose of finding reservoirs of oil underneath the earth. The revenue that can be generated by this equipment is hundreds and thousands of dollars per day. Therefore the company cannot afford for the equipment to remain idle while a software defect is fixed in the field.
2) Company A’s lack of Test Strategy and Organization coupled with no QA team caused many problems. Lack of a Risk Analysis caused low risk areas to be tested before high risk areas. There was no accountability for the testers since the developers were the testers and they were judged according to their coding skills, not QA skills. No QA training and poor Tester Professionalism resulted in low quality testing.

The mid level managers realized these problems were causing their product to be poor in quality. But their engineers were saying, ‘we are doing everything right concerning testing, there is no need to change.’ Their upper management couldn’t make the connection between the problems with the product that they were having and the lack of a professional QA organization and the mid level managers were not able to make the case for change.

At completion of the assessment that XBOSoft performed, the engineers saw clearly the need for change and enthusiastically embraced the recommendations. And the mid level managers now had the ammunition that they needed to convince upper level management to make the necessary changes. More test process assessments are now being planned for more projects in this large multi-national company.

Conclusion:

QA is a part of the Software Development Life Cycle (SDLC and should be a structured and controllable process. QA should be aligned with the business goals of the company and since each organization is unique, the QA plan for improvement must be unique to that company.

XBOSoft has successfully examined the software testing and quality processes of many companies, large and small, around the world to provide a gradual and continuous improvement of software testing, and a holistic improvement of quality for the entire company.