Impact of Overtime and Stress on Software Quality

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Producing quality software is an art in itself. Several factors contribute towards the same. In this paper we hypothesize a direct relationship between stress and quality of software. The hypothesis is based on data (Overtime, actual estimated time, defect counts) collected over a 2 year period and spans 4 projects that are similar in size, development strategy and team size.

Relation of Overtime & Stress to Defects

The background for this effort stemmed from a high number of defects noticed during quality assurance of the software lifecycle. We have made an attempt to establish a link between an aggressive schedule and its negative impact on software quality. The general pattern of this linkage is given below:

Results

Data on four projects were analyzed. The amount of scheduled work hours, actual overtime hours, and number of defects were recorded on each of these production releases. The overtime hours were seen as a reliable indicator of stress on the project team members and the level of defects was seen as an output of the stress on the project team members. Figure 1 plot's the estimated hours for each project and the actual overtime hours for each project. Additionally, the line plot indicates the level of defects for each project. As can be seen, the projects with overtime had higher defect rates.

Overtime for projects in this exercise ran at 150 to 200 hours per person on these projects. These projects are executed with a construction phase of usually 8 weeks plus an additional 8 weeks of QA. Thus, the projects are executed in a compressed time frame using overtime work to balance for the aggressive scheduling. From Figure 1, the following can be observed

1. Defect counts increases when overtime is extensive.
2. Stress on workers, and on Projects (via defects, delay etc) develops when projects are not planned and executed properly (that is, with excessive use of overtime).

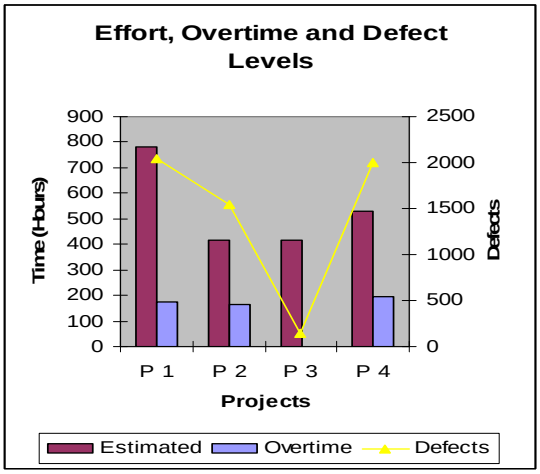

Figure 1: Project wise Effort, Overtime and Defect

Conclusion

The benefits are huge when stress is reduced. In our opinion benefit would include:

- Less stress to software engineer results in more productivity.
- Less stress means indirectly less wrangling with the QA/Project Management during triage. We can channel all the energy to good use instead of wrangling over defects.
- Having a plan which has a buffer (say 2 weeks for example) is better than under-planning. Experienced Software developers are aware that the requirements keep changing, and/or new requirements keep cropping all the time.
- It's well-established that it takes less time and costs much less to prevent defects than to fix them.
- Last but not the least by planning with human factor in mind we will introduce humane approach to development.