

# Applying Design For Six Sigma To Software And Hardware Systems



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## The ISBSG Software Project Repository: An Analysis from Six Sigma Measurement Perspective for Software Defect Estimation

Mhammed Almakadmeh, Alain Abran

École de Technologie Supérieure, Université du Québec, Montréal, Canada  
Email: mhammed.almakadmeh.1@ens.etsmtl.ca, alain.abran@etsmtl.ca

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### Abstract

The International Software Benchmarking Standards Group (ISBSG) provides to researchers and practitioners a repository of software projects' data that has been used to date mostly for benchmarking and project estimation purposes, but rarely for software defects analysis. *Sigma*, in statistics, measures how far a process deviates from its goal. Six Sigma focuses on reducing variations within processes, because such variations may lead to an inconsistency in achieving projects' specifications which represent "defects", which mean not meeting customers' satisfaction. Six Sigma provides two methodologies to solve organizations' problems: "Define Measure Analyze Improve Control" process cycle (DMAIC) and Design of Six Sigma (DFSS). The DMAIC focuses on improving the existed processes, while the DFSS focuses on redesigning the existing processes and developing new processes. This paper presents an approach to provide an analysis of ISBSG repository based on Six Sigma measurements. It investigates the use of the ISBSG data repository with some of the related Six Sigma measurement aspects, including Sigma defect measurement and software defect estimation. This study presents the dataset preparation consisting of two levels of data preparations, and then analyzed the quality related data fields in the ISBSG MS Excel data extract (Release 12 2013). It also presents an analysis of the extracted dataset of software projects. This study has found that the ISBSG MS Excel data extract has a high ratio of missing data within the data fields of "Total Number of Defects" variable, which represents a serious challenge when the ISBSG dataset is being used for software defect estimation.

### Keywords

ISBSG, Six Sigma, Defect Estimation, DMAIC, Design for Six Sigma, COSMIC Function Points

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