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Defect Parts Per Million (DPPM)

Quality management is more important today than it ever has been in production operations. More and more producers and customers are demanding greater reliability in the products they create and the products they buy. An increase in demand for greater reliability in the production fields entails an increase in reliability on the assembly lines. Many companies determine the reliability of their product(s) using a simple yet effective concept known as "defect parts per million." Defect parts per million (DPPM) can be defined as the average number of defects in an average production run multiplied by one million. DPPM is a statistic that is given as an estimation of the entire production load.

DPPM = (# defects/# opportunities) x 1,000,000

In order to use the concept known as DPPM effectively, one must understand why he/she needs to use the concept. DPPM is a concept that originated to help stakeholders of organizations compete in the highly competitive money market. DPPM is a significant tool if it is used to **improve** an organizations current output standards. Generally an organization will project where they would like their DPPM to be in x number of days.

The model known as DPPM can be used in a variety of different industries. For example, DPPM has been used to determine the reliability of information that the Internal Revenue Service provides to tax payers. It has also been used to determine the reliability

of airlines in terms of the amount of deaths that occur in that industry (the lowest DPPM known in any major industry: .52 DPPM). DPPM is essentially a statistical tool that can be used by several different groups of personnel within an organization. Accountants, financial consultants, engineers, managers, and production operators are just a few of the many groups within an organization that can use DPPM as a beneficial tool.

DPPM can be measured at various stages within the production process but the standard measurement point is at the finish of the assembly process. The finish of the assembly process is generally after the product has been packaged and shipped. With this in mind there are several conditions that could negatively affect the DPPM aside from the actual production and/or assembly of the product. They include:

- Erroneous packaging
- Products being damaged due to deficient packaging
- Misidentified parts and/or materials being packaged
- Incorrect material was shipped
- Declared product size was not in container to be shipped

Recently, a concept known as six sigma (6σ) has become popular in the electronics industry. Six sigma refers to variance or the amount of standard deviations a production run is away from being perfect (the mean projection). Six sigma is essentially having only .002 parts defective out of one million produced or a 99.9999998 percent chance that the item being produced will be defect-free. These rates are extremely exceptional and may not appear possible to implement. There is a production consulting concept called ‘Six Sigma’ that actually equates to 3.4 defects per million, not .002 parts per

million as a true 6σ would equate to. 'Six Sigma' assumes that the mean can move 1.5 standard deviations to the left or the right, leaving a standard deviation of 4.5σ. A standard deviation of 4.5σ from the mean is 3.4 parts per million. Motorola, for example, established a goal of 3.4 DPPM.

Improving production reliability standards is essential to driving a business successfully into the future. DPPM is a critical tool implemented by today's most highly competitive businesses.

There are several websites that offer more information on the DPPM and the six sigma concepts discussed above. They include:

References

Internet websites:

http://mu.motorola.com/sixsigma.shtml

www.all-six-sigma.com/SixSigmaName.htm

www.imu.ac.uk/lis/imgtserv/tools/sixsigma.htm

www.isixsigma.com

www.smartgroup.org/pdf/NepSem/BobWillisppm.pdf

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Russell, Roberta S. and Bernard W. Taylor, *Operations Management.* Upper Saddle River: Prentice Hall, 2001.