Program Details

Control Practices Description

The Control Practices program provides students with the prerequisite training needed to develop the knowledge and skills necessary for understanding and applying the essential concepts, tools, procedures, practices needed to use statistical process control (SPC). Upon completion of this training, the participant will be able to implement and sustain several common types of SPC charts for variables and attribute data.

Major emphasis is placed on the ways and means for centering a process and reducing its range of operation; thereby, increasing process capability while concurrently reducing the probability of defects. Of course, this leads to the reduction of overall operating costs. Instruction includes how to plan a control chart study, how to implement successful sampling strategies, how to compute the underpinning statistics, as well as how to uncover nonrandom trends and events commonly associated with underperforming processes. In addition, you will learn a many of the real world situations in which SPC charts can be effectively employed to enhance control, reduce variation and generate additional value – to the benefit of the customer and provider.

Throughout this curriculum, particular attention is paid to the planning, organizing, constructing, implementing, interpreting and sustaining statistical process control charts. Key insights are developed for applications, chronic process control problems and low volume environments. In addition, the development of analytical philosophy and language serves to augment the existing skills of participants. Much emphasis is placed on the construction and interpretation of SPC charts in industrial and commercial organizations. Hence, this training can be effectively put to use in small, medium and large organizations.

Reinforcement of major concepts, techniques, and application is realized through exercise, scenarios, case studies, and field studies. Total instructional time for this program is approximately 60 hours.

Control Practices Outline

Run Time (h:mm:ss)

Global Concepts — 11:07:36

Training Orientation — 1:29:43

Excel Orientation	*Explore the Excel software package*	0:29:01
Minitab Orientation	*Explore the Minitab software package*	0:31:42
Simulator Orientation	*Explore the Process Simulator*	0:29:00

Breakthrough Vision — 1:31:26

Deterministic Reasoning	*Describe a basic cause-and-effect relationship in terms of Y=f(X)*	0:52:57
Leverage Principle	*Relate the principle of leverage to an improvement project*	0:38:29

Process Management — 8:06:27

Performance Yield	*Explain why final yield is often higher than first-time yield*	1:14:06
Hidden Processes	*Describe the non-value added component of a process*	0:40:57
Measurement Power	*Describe the role of measurement in an improvement initiative*	0:33:38
Establishing Baselines	*Explain why performance baselines are essential to realizing improvement*	0:45:52
Defect Opportunity	*Understand the nature of a defect opportunity and its role in metrics reporting*	1:01:18
Process Models	*Define the key features of a Six Sigma performance model*	1:11:11
Process Capability	*Identify the primary indices of process capability*	1:21:53
Design Complexity	*Describe the impact of complexity on product and service quality*	1:17:32

General Practices — 31:52:32

Quality Tools — 9:32:59

Variable Classifications	*Define the various types of variables commonly encountered during quality improvement*	0:08:32
Measurement Scales	*Describe each of the four primary scales of measure and their relative power*	0:50:01
Problem Definition	*Characterize the nature of a sound problem statement*	0:35:25
Focused Brainstorming	*Explain how focused brainstorming is used to facilitate improvement efforts*	0:11:57
Process Mapping	*Understand how to define the flow of a process and map its operations*	0:24:20
Performance Sampling	*Explain how to design and implement a sampling plan*	0:20:17
Check Sheets	*Understand how check sheets can be used for purposes of data collection*	0:12:59
Analytical Charts	*Identify the general range of analytical charts that can be used to assess performance*	0:20:02
Pareto Charts	*Explain how Pareto charts can be used to isolate improvement leverage*	0:24:25
Run Charts	*Utilize run charts to assess and characterize time-based process data*	0:10:59
Correlation Charts	*Utilize a correlation chart to illustrate the association between two variables*	1:01:24
Frequency Tables	*Explain how to construct and interpret a frequency table*	0:14:42
Performance Histograms	*Construct and interpret a histogram and describe several purposes*	1:14:40
Basic Probability	*Understand basic probability theory and how it relates to process improvement*	0:29:16
Pre-Control Charts	*Describe the fundamental rules that guide the operation of a standard pre-control plan*	0:41:25
Control Charts	*Explain the purpose of statistical process control charts and the logic of their operation*	1:41:11
Score Cards	*Understand the purpose of Six Sigma score cards and how they are deployed*	0:31:24

Basic Statistics — 9:05:33

Performance Variables	*Identify and describe the types of variables typically encountered in field work*	0:10:26
Statistical Notation	*Recognize and interpret the conventional forms of statistical notation*	0:44:53
Performance Variation	*Explain the basic nature of variation and how it can adversely impact quality*	0:22:24
Normal Distribution	*Describe the features and properties that are characteristic of a normal distribution*	0:49:36

Distribution Analysis	*Explain how to test the assumption that a set of data is normally distributed*	1:21:06
Location Indices	*Identify, compute, and interpret the mean, median, and mode*	0:42:05
Dispersion Indices	*Identify, compute, and interpret the range, variance, and standard deviation*	1:16:37
Quadratic Deviations	*Understand the nature of a quadratic deviation and its basic purpose*	0:24:47
Variation Coefficient	*Compute and interpret the coefficient of variation*	0:07:17
Deviation Freedom	*Explain the concept of degrees-of-freedom and how it is used in statistical work*	0:29:47
Standard Transform	*Describe how to transform a set of raw data into standard normal deviates*	0:47:51
Standard Z-Probability	*Describe how to convert a standard normal deviate into its corresponding probability*	0:40:58
Central Limit	*Understand that the distribution of sampling averages follows a normal distribution*	0:17:29
Standard Error	*Recognize that the dispersion of sampling averages is described by the standard error*	0:13:32
Student's Distribution	*Understand that the T distribution applies when sampling is less than infinite*	0:06:07
Standard T-Probability	*Describe how to convert a T value into its corresponding probability*	0:15:26
Statistics Simulation	*Employ basic statistics to analyze data generated by the process simulator*	0:15:12
Continuous Capability		**8:32:11**
Performance Specifications	*Explain the basic nature and purpose of performance specification limits*	0:14:39
Rational Subgrouping	*Explain how to form rational subgroups and describe their purpose in Six Sigma work*	1:19:00
Capability Study	*Understand the concept of process capability and how it applies to products and services*	1:32:55
Instantaneous Capability	*Understand the concept of instantaneous capability in relation to Six Sigma work*	0:47:58
Longitudinal Capability	*Understand the concept of longitudinal capability in relation to Six Sigma work*	0:47:30
Cp Index	*Compute and interpret Cp*	0:11:57
Cpk Index	*Compute and interpret Cpk*	0:19:53
Pp Index	*Compute and interpret Pp*	0:13:41
Ppk Index	*Compute and interpret Ppk*	0:24:10
Process Shifting	*Understand the impact of process centering error on short-term capability*	0:29:10
Process Qualification	*Determine the required level of short-term capability necessary to qualify a process*	1:39:20
ConcaP Simulation	*Apply continuous indices of capability to the process simulator*	0:31:58
Discrete Capability		4:41:49
Defect Metrics	*Identify and describe the defect metrics commonly used in Six Sigma work*	0:11:26
Defect Opportunities	*Understand the nature and purpose of defect opportunities in terms of quality reporting*	0:43:08
Binomial Distribution	*Describe the features and properties that are characteristic of a binomial distribution*	0:59:19
Poisson Distribution	*Describe the features and properties that are characteristic of the Poisson distribution*	0:39:31
Throughput Yield	*Compute and interpret throughput yield in the context of Six Sigma work*	0:08:53
Rolled Yield	*Compute and interpret rolled-throughput yield in the context of Six Sigma work*	0:20:42
Metrics Conversion	*Convert yield and defect metrics to the sigma scale of measure*	1:32:19
DiscaP Simulation	*Apply discrete indices of capability to the process simulator*	0:06:31
Technical Practices		**14:32:42**
Hypothesis Testing		**6:05:49**
Statistical Inferences	*Explain the concept of a statistical inference and its primary benefits*	0:23:00
Statistical Questions	*Explain the nature and purpose of a statistical question*	0:20:35
Statistical Problems	*Understand why practical problems must be translated into statistical problems*	0:10:43
Null Hypotheses	*Define the nature and role of null hypotheses when making process improvements*	0:31:29
Alternate Hypotheses	*Define the nature and role of alternate hypotheses when making process improvements*	0:18:03
Statistical Significance	*Explain the concept of statistical significance versus practical significance*	0:56:05
Alpha Risk	*Explain the concept of alpha risk in terms of the alternate hypothesis*	0:24:18
Beta Risk	*Define the meaning of beta risk and how it relates to test sensitivity*	0:38:41
Criterion Differences	*Explain the role of a criterion difference when testing hypotheses*	0:15:49

Decision Scenarios	*Develop a scenario that exemplifies the use of hypothesis testing*	0:17:09
Sample Size	*Define the statistical elements that must be considered when computing sample size*	1:49:57
Confidence Intervals		**2:47:17**
Mean Distribution	*Comprehend and characterize the distribution of sampling averages*	0:04:21
Mean Interval	*Compute and interpret the confidence interval of a mean*	0:54:29
Variance Distribution	*Comprehend and characterize the distribution of sampling variances*	0:21:10
Variance Interval	*Compute and interpret the confidence interval of a variance*	0:35:52
Proportion Distribution	*Comprehend and characterize the distribution of sampling proportions*	0:07:22
Proportion Interval	*Compute and interpret the confidence interval of a proportion*	0:27:02
Frequency Interval	*Describe how frequency of defects is related to confidence intervals*	0:17:01
Control Methods		**4:23:52**
Statistical Control	*Explain the meaning of statistical control in terms of random variation*	0:31:37
Control Logic	*Explain the logic that underpins the application of a control chart*	0:16:21
Control Limits	*Reconcile the difference between specification limits and control limits*	0:25:34
Chart Selection	*Explain how to rationally select a control chart*	0:08:07
Chart Interpretation	*Interpret an SPC chart in terms of its control limits*	0:30:30
Zone Testing	*Explain the concept of zone tests and their application to SPC charts*	0:43:18
Variables Chart	*Characterize the role and purpose of a variables chart*	0:08:38
Attribute Chart	*Characterize the role and purpose of an attribute chart*	0:04:37
Individuals Chart	*Construct and interpret an individuals control chart*	0:09:58
IMR Chart	*Construct and interpret an individual moving range control chart*	0:09:01
Xbar Chart	*Construct and interpret a control chart for subgroup averages*	0:06:33
Range Chart	*Construct and interpret a control chart for subgroup ranges*	0:10:27
Proportion Chart	*Construct and interpret a control chart for sampling proportions*	0:11:15
Defect Chart	*Construct and interpret a control chart for defect occurrences*	0:13:09
Other Charts	*Describe several other types of control charts used in Six Sigma work*	0:02:00
Capability Studies	*Explain the role of capability studies when making process improvements*	0:22:00
Control Simulation	*Apply common SPC methods to the process simulator*	0:10:47
Measurement Analysis		**1:15:44**
Measurement Uncertainty	*Understand the concept of measurement uncertainty*	0:15:43
Measurement Components	*Describe the components of measurement error and their consequential impact*	0:15:42
Measurement Studies	*Explain how a measurement systems analysis is designed and conducted*	0:44:19
	Total Video Run Time	**57:32:50**