Course Syllabus for:

Introduction to Problem Solving and Process Improvement

Course Code	CEUs
6-341	0.6 CEUs

Course Introduction

This course provides participants with an overview of basic problem solving with an emphasis on the effective use of quality tools and root cause analysis. A five-step approach to problem solving is presented, encouraging the necessary "closed loop" thinking that drives better problem solutions and facilitates improvement. Data collection and data analysis tools are briefly described leading to improved communication about problems and fostering efficient problem solving. Examples are drawn from a metalcasting environment. Participants will be able to assess their own problem solving methods for gaps as they survey the sequence and systems approach presented to resolve quality problems.

Benefits to Taking the Course:

This course provides a concise overview of problem solving that will provide an opportunity for a realistic assessment of the gaps in participant's own problem solving methods. The system of problem solving will be explained from the perspective of "Why" not so much "How" so that attendees gain a seasoned perspective of problem solving. Various common quality tools will be explained so that their application and role in problem solving will be understood.

Learning Outcomes

At the end of this course, participants should be able to:

1. Describe structured problem solving approaches.
2. Develop effective problem definitions.
3. Describe process behaviors and identify process inputs and outputs.
4. Distinguish between expected and unexpected process performance.
5. Explain why process stability is required for improvement.
6. Characterize problems to develop possible root causes.
7. Recognize various methods for collecting and analyzing data.
8. Determine process improvement solutions and countermeasures (short-term vs. permanent).
9. Implement corrective action to sustain improvement.

Lesson Plan

Basic Concepts and Problem Definition

- Structured Problem Solving for Metalcasting Facilities
- Problem Solving Basics
- Effective Problem Definition

Teams, Project Management, and Process Thinking

- The Project Team
- Process Thinking
- Understanding Process Variation

Driving Toward Root Cause

- Root Causes
- Tools for Identifying Possible Root Cause
- Problem Solving Group Activity

The Nature of Data

- Types of Data Used
- Distributions
- Using Statistics to Understand Your Data

Collecting and Analyzing Data

- Measurement Uncertainty
- Analyzing and Presenting Data

Process Stability and Capability

- Is the Process Capable of Consistently Meeting Customer Requirements?

Testing the Root Cause

- Testing the Root Cause

Closing the Loop: Implementing and Monitoring Changes

- Developing Solutions
- Evaluating Solutions
- Sustaining the Improvement
- Long-term Process Monitoring

Instructional Methods:

- Group activities
- Class discussion
- Problem solving exercises
- Case studies

Assessment Methods:

No formal assessment will take place in this course; however, attendees will participate in informal activities such as knowledge check and Q&A sessions with the facilitator to verify that learning outcomes are being met. Assessment of successful achievement of learning outcomes must be included throughout the course in order to meet the ANSI/IACET 1-2013 standard for continuing education programs and for CEUs to be awarded.

Course Prerequisites:

Prior to taking this course, participants should be able to:

- Identify general opportunities for potential process improvement projects involving specific metalcasting quality defects
- Work well in team environments
- Communicate well with plant floor personnel and management
- Value the fundamentals of data analysis and appreciate a careful and deliberate approach to problem solving.

Prior to taking this course, participants should know:

- Basic statistical concepts and terminology
- Some basic working knowledge of Excel, Minitab, or similar software to manage and analyze data
- The basics of gathering necessary data required for developing control strategies
- How to read engineering drawings

Attendee Requirements to Earn CEUs:

1. Present at least 5.5 hours of the total 6 hours of instructional time, which does not include lunch or breaks.
2. Active participation (can include asking questions, communicating with other attendees during and taking part in group activities, providing responses during whole class or group discussions).
3. Successful achievement of learning outcomes.

Who Should Attend?

The target audience for this course consists of individuals responsible for technical problem solving, especially in a casting environment; process improvement (technical/manufacturing); resolving acute and/or chronic quality or productivity issues; developing problem solving and/or process control plans and effective control strategies; effecting process improvement change within their own organization.

This may include:

- Production management personnel such as Area/Plant Managers, Foundry Superintendents, and Production Foreman/Supervisors interested in quality efforts
- Process and Quality Engineers
- Selected operating personnel such as technicians, floor personnel, cleaning and maintenance personnel, students or others involved in quality efforts