



Construction Industry Institute®

Achieving Zero Rework through Effective Supplier Quality Practices

Construction Industry Institute

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**Prepared by
Construction Industry Institute
Research Team 308, Achieving Zero Rework
through Effective Supplier Quality Practices**

**Research Summary 308-1
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Executive Summary

The quality of materials and equipment supplied to a capital project directly affects the ability of the project team to complete it on time and on budget. The fact that so many items are custom, one-of-a-kind, or made of rare materials makes supplier quality particularly important in the construction of capital projects. CII Research Team (RT) 308, Achieving Zero Rework through Effective Supplier Quality Practices, worked to find the most effective processes and practices for ensuring that project materials and equipment are produced, manufactured, or fabricated in strict accordance with all applicable specifications and that, once delivered to the project site, they do not require any rework.

The research team pursued the following objectives:

- Describe the current processes for assuring component quality in the construction industry and other industries of interest.
- Measure the performance of these practices with appropriate metrics.
- Develop and validate a model of the supplier quality reliability endeavor.
- Use the model developed to propose alternative practices, and predict the impact of these new practices.
- Develop appropriate vehicles for dissemination and implementation of the findings.

The team gathered the data for this research from the following sources: documents from owner, contractor, and supplier companies; research literature on quality in construction and other industries; interviews at contractor and supplier facilities; supplier focus groups; CII member purchase order records. Using this data, the research team developed the following: the Supplier Quality Process Map; a summary of current practices found in the literature; a glossary of terms and acronyms; a supplier wish list of purchaser practices; statistical analysis of current supplier quality

surveillance (SQS) performance for several commodity categories; and a simulation model for estimating the impact of the cost of non-quality to support supplier selection.

While the review of literature outside the industry did not find any work processes that are not already used in construction, the team did discover that these practices are not applied consistently across the industry. In addition, the literature review and simulation model do not support the commonly held notion that inspection is not an effective method of improving manufacturing quality outcomes. Based on its findings, RT 308 recommends that companies consistently use the practices presented in Implementation Resource (IR) 308-2, *Achieving Zero Rework through Effective Supplier Quality Practices*, to manage supplier quality. The team further encourages readers to utilize the decision-support tool also presented in that resource, to project the cost of non-quality and to support supplier selection.

Introduction

Construction of a capital project requires the supply of a multitude of materials and equipment to the project site for installation. These materials and equipment are sourced from around the globe, many times never being trial-fit or tested in a shop prior to installation in the facility. Many of the items required are custom, one-of-a-kind, or made of rare materials, which makes their quality particularly important. Supplier quality has a direct impact on a project team's ability to complete projects on schedule and on budget. Traditionally, supplier quality surveillance (SQS) work processes have been used as a risk mitigation technique; by reducing the number of supplier defects discovered at the project site, these processes reduce the cost and schedule impacts associated with any quality-related rework.

Over the past few years, several factors have led to increased supplier quality discrepancies found in fabrication facilities and at project sites. First, Western suppliers are facing an aging workforce, with fewer qualified craftspeople available for employment, along with increased pressure to drive down costs. Some well-known suppliers have increased the amount of work they sub-contract out to sub-suppliers. At the same time, clients and contractors in search of lower capital costs are more open to procuring from low-cost sourcing countries. These emerging country sources may have state-of-the-art facilities, but are not accustomed to working to Western quality standards. Given this combination of factors, traditional SQS techniques no longer attain the expected results.

To help companies address the growing concern over poor supplier quality, CII formed Research Team (RT) 308, Achieving Zero Rework through Effective Supplier Quality Practices, to identify the most effective

processes, practices, and metrics (both traditional and enhanced) for improving supplier quality and performance by addressing the following essential question:

What are the most effective processes and practices for ensuring that project materials and equipment are produced, manufactured, or fabricated in strict accordance with all applicable specifications, and that they are delivered to the project site without any need for rework?

Objectives

In order to answer the essential question, the research team established five objectives:

1. Describe the current process for assuring component quality in the construction industry and other industries of interest.
2. Measure the performance of these practices using appropriate metrics, including benefit and cost parameters, and statistically assess the value of these measures.
3. Develop and validate a model of the supplier quality reliability endeavor, and validate using data from existing practices.
4. Use the validated model to predict the impact of alternative practices proposed by the research team.
5. Develop appropriate vehicles for dissemination and implementation of the findings, to include a research summary, research report, and implementation resource.

RT 308 achieved each of these five objectives.

Scope Limitations

The team restricted its work to a portion of a typical EPC/design-build project, extending from the supplier qualification stage through site acceptance, but excluding criticality review practices. The team restricted its focus to the life of the supply chain, from purchase order to commodity acceptance, and did not include logistics, expediting, and warranty. Although the quality of the purchase order specification