Best Practices for an Effective QA/QC Program

Presented by: Jim Ilkay
What is a QA/QC program?

A Quality Assurance program is a set of processes that help ensure a desirable outcome by reducing defects and non-conformance. The program starts at the design phase and includes the specification, procurement, manufacturing, fabrication, installation, and commissioning of materials and/or equipment.

Quality Control is a component of the Quality Assurance program, and involves inspections and testing to identify defects and non-conforming items. Quality Control also provides a valuable feedback loop to improve the Quality Assurance process.
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Perspective and Trends

- Changing Procurement Models (Bid-Build to Design-Build-Finance-Operate)
  - Less traditional bid-build models
  - Low bid vs Best Bid
  - Lifecycle focus
  - Value for money focus
  - Design not driving the process
- Greater interest in best practices
- More joint ventures and publicly traded firms entering the market

Focus on QUALITY is more important than ever
Accepting & Managing Risk is Becoming the Best Option

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>ISSUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer the Risk</td>
<td>Party transferring risk doesn’t have a clear understanding of the risk being assumed. Party accepting risk often lacks capacity to perform.</td>
</tr>
<tr>
<td>Insure the Risk</td>
<td>In a rapidly changing market, insurers cannot effectively underwrite risk based on past performance. Reinsurance market affects are impacting insurance capacity.</td>
</tr>
<tr>
<td>Accept and Manage the Risk</td>
<td>Identifying and implementing consistent best practices to manage risk, and providing stakeholders with evidence of compliance.</td>
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</tbody>
</table>
QA/QC and Better Insurance Terms

- Insurers are paying much more attention to best practices (QA/QC is king)
- Impacts virtually all lines of insurance cover
- QA/QC is leading to new and expanded covers (innovation!)
- Insurance industry is using claims data to develop Best in Class QA/QC
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Benefits of an Effective QA/QC Program

- Reduced defects & rework
- Assurance payments are in lock-step with work
- Quicker holdback release (bill more confidently; pay more confidently)
- Better insurance and performance security terms
- Lower asset lifecycle costs
- Enhanced reputation and improved client and subcontractor relations
- Greater certainty of project success
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Designing a Best-in-Class QA/QC Program

- Identifying and documenting best practices
- Implementation and Operation
- Continuous improvement (feedback loops)
- Evidence of compliance (audits)
Step 1: Identifying and Documenting Best Practices

Enterprise Level Best Practices

• Full time Quality Director (Director of Continuous Improvement)
• Clear authority, responsibility for identifying and documenting best practices
  – On and off site
  – Authority is crucial (management must be clear of authority)
• Document existing best practices (Visio diagrams and narrative description)
• Design for easy evidence of compliance (dashboards, threshold reporting)
• Continuous Improvement Process to identify and evaluate process improvements
• Project audits on major milestones and completion (feedback loop)
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Step 1: Identifying and Documenting Best Practices

Project Specific Best Practices

- QA/QC Plan reviewed and accepted by project team prior to construction
- Inspections and deficiency reports – tied to specifications
- Incorporate third party quality programs and inspectors
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Step 1: Identifying and Documenting Best Practices

QA/QC Processes
- Procedures for documenting and communicating deficiencies
- Defined inspections forms (100% adherence)
- Procedures for procurement (shop inspections, drawings, testing)
- Procedures for verifying materials with specs (100% adherence)
- Written mock-up protocols
- Criteria for nondestructive and destructive testing
- Criteria for using internal and third party inspectors
- Standards for addressing warranty claims/complaints
- Process to ensure Manufacturer Installation Guidelines are adhered to
- Standards for records maintenance (statute of limitations)
Implementation success depends a lot on the approach
# Best Practices for an Effective QA/QC Program

## Traditional Management Systems – Lots of Duplication of Effort

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
</table>
| **1** | **Communication** | • Emails  
• Faxes  
• Paper |
| **2** | **Document Control** | • Shared drives  
• My Documents folder  
• Document management systems |
| **3** | **Process Tracking** | • Excel spreadsheet logs  
• MS Access or SQL databases |
| **4** | **Budget/Schedule/Quality** | • Excel spreadsheets  
• Scheduling software  
• MS Word checklists |
| **5** | **Reporting** | • Excel spreadsheets  
• Word documents  
• Crystal reports |
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Integrated Management Systems

- **Forms**
  - (equivalent to paper forms, but device independent)

- **Rules**
  - (workflow processes, notifications, communication)

- **Data**
  - (tables, fields, attributes)

- **Reporting**
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Examples: Integrated Vendor Controls and Rating System

1. New Vendor
   Gatekeeper Approved

2. Not Rated
   Form Generated

3. Information Pending

4. Verification Pending

5. Evaluation Pending

6. Rating Assigned

7. Rating Expiring

Notifications & Reminders

Reject - Request
More Information

Initiate Renewal Process
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## Examples: Integrated Procurement Controls System

<table>
<thead>
<tr>
<th>Corporate Controls &amp; Templates</th>
<th>Contract Templates, Terms &amp; Conditions</th>
<th>Library of Scope Language</th>
<th>Contract Admin Requirements</th>
<th>Vendor Controls &amp; Rating Process</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project Level Processes</th>
<th>Plans Room, Bid Invitations</th>
<th>Pre-award Checklists</th>
<th>Bid Analysis and Leveling</th>
<th>Electronic Contract Packages</th>
</tr>
</thead>
</table>

|---------------------------|-------------------------------|------------------------------------------|-------------------------|------------------|

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Presented by Jim Ilkay – November 18, 2009
Examples: Procurement Risk Waiver Process

Bids Received & Reviewed → Contract Award Process Initiated → Flags Tripped? → Contract Award Process → Contract Issuance & Admin

Risk Waiver Process
- Remove flags
- Add special conditions (automatically appended to contract document)
Quality Program Elements

- AIR BALANCING
- ARCHITECTURAL FIELD REPORT
- BUILDING ENVELOPE INSPECTIONS
- CITY OF CALGARY DEVELOPMENT AND BUILDING APPROVALS
- COMMISSIONING REPORTS
- CONCRETE TEST RESULTS
- CONSTRUCTION WASTE MANAGEMENT REPORTS
- ELECTRICAL SITE REVIEW
- EVENTS
- FIRE ALARM
- INDOOR AIR QUALITY (IAQ) INSPECTIONS
- LEED
- LEED - SUBTRADE SUBMISSIONS
- MECHANICAL SITE REVIEW
- QA/QC - AIR/VAPOR BARRIER
- REBAR TEST REPORTS
- RJC FIELD REPORTS
- SEDIMENTATION CONTROL INSPECTION REPORTS
- SITE SERVICES TESTS
- SITE SERVICES/UNDERGROUND INSPECTIONS
- SOIL TEST REPORTS
- STRUCTURAL STEEL INSPECTIONS
- VALUE ENGINEERING & CONSTRUCTABILITY REPORTS
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Step 2: Implementation and Operation

Reports Associated with a Program Element
### Deficiency Items Associated with a Report

<table>
<thead>
<tr>
<th>Step</th>
<th>Deficiency Description</th>
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</table>
| 4 1.1 | Mechanical Penthouse: -  
  | Mechanical: The approved shop drawings for the heating and cooling pumps contain a note that all pump motors were to be Premium Efficiency. |
| 5 | Mechanical Penthouse: -  
  | Mechanical: The approved shop drawings for the heating and cooling pumps contain a note that all pump motors were to be Premium Efficiency. |
| 6 1.2 | Mechanical Penthouse: -  
  | Mechanical: No low point drains are presently provided at the pumps. |
| 7 1.3 | Mechanical Penthouse: -  
  | Mechanical: No isolation valves are provided adjacent to the air separators for servicing their strainers. (An option could be to remove these strainers from |
| 8 1.4 | Mechanical Penthouse: -  
  | Mechanical: No CRN Number could be located on the Chiller. |
| 9 1.5 | Mechanical Penthouse: -  
  | Mechanical: The shop drawings and AHU nameplate for the heat wheel indicate the wheel's motor was to be 3/4 |
Step 3: Operation of an Integrated QA/QC Plan

Item Details – With Complete Audit Trail

Quality Control Deficiency No. 6 (3/06/2007)

Status

Assigned To: [Details]
Priority: [Details]
Due Date: 3/13/2007

APPROVAL PROCESS

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SIGN OFF COMMENTARY

ATTACHMENTS

ITEM HISTORY

ITEM CREATED - 03/00/2007 09:17:45 AM
ORIGINATED BY [Details] 03/06/2007 08:17:49 AM
ITEM FULLY SIGNED OFF - 10/16/2007 8:31:25 AM
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Step 3: Operation of an Integrated QA/QC Plan

Tracking/Reporting Open Items
Staff Training & Qualification

- Integrate into overall company education program
- Defined training process, based on role
- Levels of competency (ratings)
- Training encourages consistency across all projects
Step 3: Continuous Improvement

- Post project audits (checklists and narrative reports)
- Lessons learned (issue tracking throughout the life of the project)
- Anomalies (positive or negative)
- Changes to business processes must follow Continuous Improvement Process and be fully implemented (communication, training, adjustments to management systems)
Step 4: Evidence of Compliance

- Simple to do with integrated management system, otherwise difficult and expensive
- Evidence of compliance should be designed into every aspect of the system
- Substantial decrease in claims, and cost of claims preparation
Conclusion

- Significant savings more than offset costs of implementation
  - Insurance, claims, rework, lifecycle costs, owner relations, subcontractor relations
- Adoption of QA/QC programs is growing (all sizes of contractors)
- Dovetails with burgeoning Lifecycle project industry
- Effectively becoming a barrier to entry for Contractors – early adopters have moved well ahead of the pack
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Questions/Comments
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Jim Ilkay
Project Technology Group

15 Allstate Parkway, Suite 201
Markham, Ontario  L3R 5B4

(905) 474-5660 office
(647) 295-6226 cell

jim.ilkay@ptaginc.com
www.ptaginc.com