The Expanding Role of the Construction Safety Professional

Brian Clarke, CSP

CEO/Founder

Quality Safety Times

Why Are We Here this AM

- Loss Prevention Vs Safety
- Summary of related research on Cost of Re-Work
- Parallels Safety and Quality
- A little reference CII and AIA
- Worksheet tool to Identify Losses
- Recommendation to reduce Re-work costs and financially influence your organization
- Maybe a Marketing Opportunity for you

Changing How the World Builds

AIA Contract Documents

powered by catina

Why Are We Here?
"A little more in depth"

1. Challenge some historical thoughts on roles of the "Safety Director" & where we might want to concentrate more of our efforts
2. Safety Professionals are in the position to positively influence this increasing financial loss in our firms.
3. Research has identified a direct relationship between Re-work and craft worker injuries.
4. The financial impact of re-work ranges from 4% - 30% of project costs.
5. Quality programs should be built on the safety model.
6. Defect claims are 2nd most pressing challenge (behind worker safety)

"Cut first, fix it later." *- Chat GPT on the modern worker*

Who is in the room/ Goal of your organization:

1. Governmental Organizations
2. Non-Profits
3. Researchers
4. For Profit Organizations

Get your smart phones out. Please.
www.qualtysafetytimes.com

Definitions

Safety

- Condition of being safe from undergoing or causing hurt, injury, or loss

Risk Management

- Forecasting and evaluation of financial risks with identification of procedures to avoid or minimize their impact

Loss Prevention

- Measures taken to prevent or reduce loss of life, health, and property

Loss Prevention

* % of Project losses?
* % of Your loss control time?

Employee Safety

Fleet Management

Public Protection

Building Protection

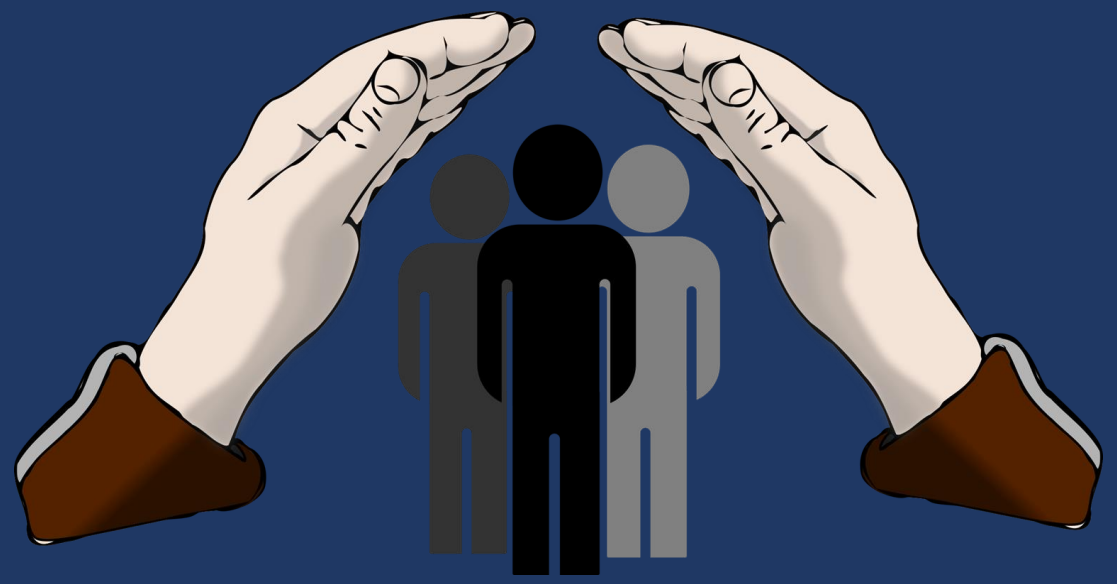
Contents

Wrongful Dismissal, Harassment, etc.

Business Interruption

Inland Marine

Quality Control *Today's emphasis



Our #1 Goal is to prevent/reduce impact to individuals

What's the Mission of the ASSP?

Expanding Role for Safety in Construction

ASSE article

“Quality Management In Construction; An Expanding Role For SH&E Professionals”

Peer-Reviewed

Quality Management in Construction

An Expanding Role for SH&E Professionals

By Sathy Rajendran, Brian Clarke and Richard Andrews

The role of construction safety professionals has significantly expanded over the past decade. The industry employs thousands of safety professionals, most of whom work for contractors (general or subcontractors).

Prior to the 1980s, only a few progressive owners held employees and construction contractors who worked in their facilities to a higher level of safety performance than OSHA standards. Then came a real push for safety performance excellence as insurance carriers demanded that contractors provide their own full-time safety field supervision. In

The traditional approach to construction safety has been to 1) develop and implement company safety programs; 2) work with regulatory agencies to develop and implement safety rules and regulation; 3) encourage professional de-

IN BRIEF

- **This article examines the feasibility of integrating safety and quality management, the parallels between safety and quality management responsibilities, and the interrelationship between construction safety and quality.**
- **It also explores the role of safety professionals in field construction quality management and reviews what a construc-**

Parallels Safety and Quality Program Components

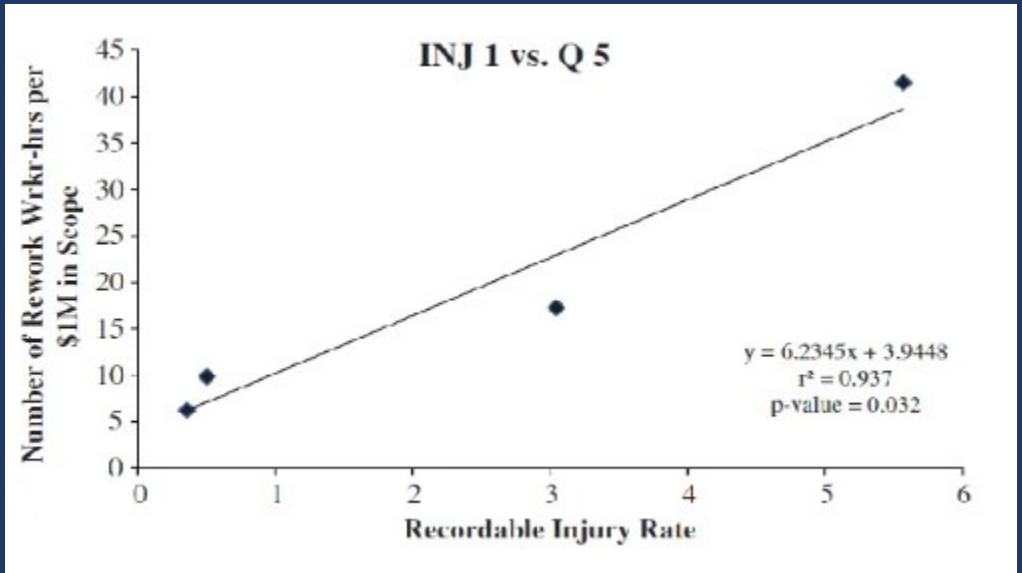
Safety

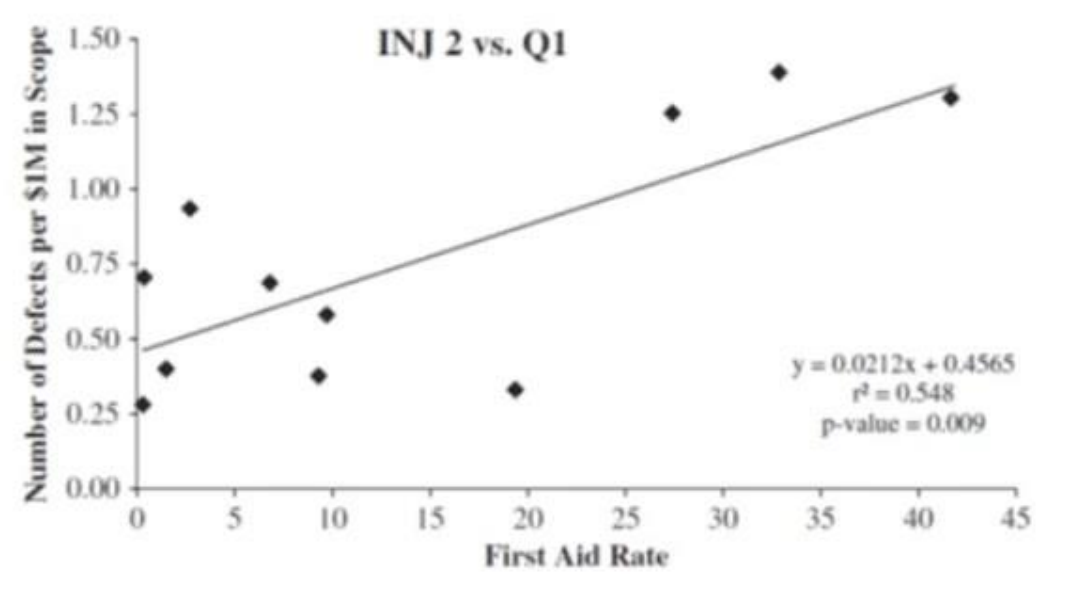
- Leadership Engagement
- Contractual Requirements
- Pre-Construction Meetings
- Inspection Processes
- Orientations
- JHA/PTP/A3 processes
- Task Specific Training (i.e. fall protection, confined space)
- Weekly Safety Meetings/ Toolbox Talks
- After Action Reviews/Lessons Learned
- Drug and Alcohol Testing

Quality

- Leadership Engagement
- Contractual Requirements
- Pre-Construction Meetings
- Inspection Processes
- Orientations
- JHA/PTP/A3 processes
- Task Specific Training (i.e. fire caulking, mock-up testing)
- Insurance Coverage?
- After Impact reviews
- Missing is what?

Relationship Safety & Quality





Cost of Re-work

"The unnecessary effort of redoing a process or activity that was incorrectly implemented in the first instance"

OR

NOT BUILDING IT RIGHT THE FIRST TIME

Research

- **Egan – up to 30% (project costs)**
- **CII – 12% (contract budget)**
- **Rhodes – 12.4% (project costs)**
- **Palaneeswaran 3.8% of project costs)**
- **8-20% schedule growth – Re-work**

Evolution of Safety – a Guide for Quality

Measuring Losses

G.E.W. llc
Incident Indirect Cost Sheet

Contractor
Job Site: _____ Date: _____
Injured Employee(s): _____ Time: _____
Foreman's Name: _____ General Foreman: _____
Type of Incident (Near Hit, First Aid, Recordable, Lost Time): _____
Description of Incident: _____

Supervisor's Billing Rate: $ 0.00

Supervisor's Time	Hours	Cost
Time at incident event	0.00	$ -
Transport and/or time at medical facility with employee(s)	0.00	$ -
Related paperwork/reports/incident review	0.00	$ -
Repair/re-order of equipment	0.00	$ -
Re-schedule of work	0.00	$ -
Replacement employee(s), hiring, training	0.00	$ -
Other (Describe):	0.00	$ -
Subtotal	0.00	$ -

Injured Employee's Billing Rate. $ 0.00

Employee(s) Time				Hours	Cost
Time away from productive work (medical appointments, paperwork)				0.00	$ -
Additional training				0.00	$ -
% Reduction for Light Duty	0%	Days	0.00	0.00	$ -
			Subtotal	0.00	$ -

Average Billing Rate for Crew: $ 0.00

Crew Time				Hours	Cost
Time around incident event hrs.	0.00	Employees	0.00	0.00	$ -
Investigation time (witness, paperwork): Total hours of all.					
Training about incident hrs.	0.00	Employees	0.00	0.00	$ -
			Subtotal	0.00	$ -

Property/Equipment Damage or Loss

Equipment Repair/Replacement/Rental	Cost
List items:	$ -

Others invovled in investigation/down time (I.e. project engioneer, project super, safety/claims, clerical)

	Rate	Hours	Cost
List person:	0.00	0.00	$ -
	0.00	0.00	$ -
	0.00	0.00	$ -
	0.00	0.00	$ -

Total Indirect Cost $ -

The above costs do NOT include office staff (processing reports, filing claims, return to work moniting
The above costs are NOT typically covered by Insurance

Rev: 08/05

2003 Gary E Bird Horizon Award

Donna Bird

Jack Gibson

Cost of Employee Injuries

Direct Costs
Indirect Costs

What's your Profit Margin?

		Profit Margin %			
Loss Value		3%		5%	
$	50,000	$	1,666,667	$	1,000,000
$	250,000	$	8,333,333	$	5,000,000
$	500,000	$	16,666,667	$	10,000,000
$	1,000,000	$	33,333,333	$	20,000,000

Incident / Injury Cost Tracking Worksheet

Contractor:
Job Site:
Injured Person:
Site Super:
Date:
Time:
Direct Supervisor:
Type of Incident (Near Hit, First Aid, Recordable, Lost Time):
Description of Incident:

Supervisor's billing Rate: $

Supervisor's Time	Hours	Cost
Time at incident event		
Transport and/or time at medical facility with employee(s)		
Related paperwork/reports/incident review		
Repair/re-order of equipment		
Re-schedule of work		
Replacement employee(s), hiring, training		
Other (Describe):		

Injured Employee's billing rate:

Employee(s) Time			Hours	Cost
Time away from productive work (medical appointments, paperwork)				
Additional training				
% Reduction for Light Duty	1.00	Days		$ -

Average billing rate for crew $

Crew Time		Hours	Cost
Time around incident event hrs.	Employees		$ -
Investigation time (witness, paperwork): Total hours of all.			
Training about incident hrs.	Employees		$ -

Property/Equipment Damage or Loss

Equipment Repair/Replacement/Rental	Cost
List items:	

Others invovled in investigation/down time (I.e. project engioneer, project super, safety/claims, clerical)
Identify if Direct or Subcontractor staff

	Rate	Hours	Cost
List people:			
Total Indirect Cost			
Medical Expenses (Deductibles & other $ NOT paid by insurance)			
Total Direct and Indirect			#VALUE!
Profit Margin on Job	Enter %		
Total Extra work required to recover this loss			#VALUE!

The above costs do NOT include office staff (processing reports, filing claims, return to work moniting

The above costs are NOT typically covered by Insurance such as medical bills, time loss payments etc.

Rev: 01/2025

Profit Margin %								
Loss Value		3%		5%		10%		15%
$	50,000	$	1,666,667	$	1,000,000	$	500,000	$ 333,333
$	250,000	$	8,333,333	$	5,000,000	$	2,500,000	$ 1,666,667
$	500,000	$	16,666,667	$	10,000,000	$	5,000,000	$ 3,333,333
$	1,000,000	$	33,333,333	$	20,000,000	$	10,000,000	$ 6,666,667

To determine extra work required to recapture loss identify your total loss and divide by your profit margin

How To Measure Re-work

Quality Safety Times

Rework - Cost Sheet (Detailed)

Contractor: _____ **Incident/Injury Involved?** _____

Job Site: _____ **Date:** _____

Scope of Work: _____ **Time:** _____

Tradepartner: _____ **Crew Lead** _____

Reason(s) for rework (Example: Materials, Workmanship, Specs Non-Compliance, Incident, etc.)

Description of Incident: _____

Direct Costs to Conduct Rework $ _____

Tear out / Removal of Finished Work	**Cost**
Crew Time (see billing rate below)	$ -
Tools / Equipment Used	
Consumables Used	
Safety Protocols (i.e. training (silica, respiratory protection)	
New Installation Material Costs	
Replacement employee(s), hiring, training	
Additional GCs/GRs	
LD's	
Secondary Mobilization Fees	
Other (Describe):	
Other (Describe):	

Indirect Costs to Conduct Rework $ _____

Tear out / Removal of Finished Work	**Cost**
Lost Crew Time (see billing rate below)	
Schedule Delays	
Investigation Time (Determining fix, Cause, Responsible Party)	
Insurance Claim Management (if applicable)	
Other (Describe):	
Other (Describe):	

Direct Costs to Conduct Rework $ _____

Replacement / Repair	**Cost**
Crew Time (see billing rate below)	$ -
Tools / Equipment Used	
Consumables Used	

Quality Safety Times

PROFIT MARGIN CALCULATIONS

	Profit Margin %					
Loss Value	3%	1%	5%	7%	10%	15%
$ 10,000	$ 333,333	$ 1,000,000	$ 200,000	$ 142,857	$ 100,000	$ 66,667
$ 19,150	$ 638,333	$ 1,915,000	$ 383,000	$ 273,571	$ 191,500	$ 127,667
$ 50,000	$ 1,666,667	$ 5,000,000	$ 1,000,000	$ 714,286	$ 500,000	$ 333,333
$ 100,000	$ 3,333,333	$ 10,000,000	$ 2,000,000	$ 1,428,571	$ 1,000,000	$ 666,667
$ 150,000	$ 5,000,000	$ 15,000,000	$ 3,000,000	$ 2,142,857	$ 1,500,000	$ 1,000,000
$ 200,000	$ 6,666,667	$ 20,000,000	$ 4,000,000	$ 2,857,143	$ 2,000,000	$ 1,333,333
$ 300,000	$ 10,000,000	$ 30,000,000	$ 6,000,000	$ 4,285,714	$ 3,000,000	$ 2,000,000
$ 400,000	$ 13,333,333	$ 40,000,000	$ 8,000,000	$ 5,714,286	$ 4,000,000	$ 2,666,667
$ 526,317	$ 17,543,900	$ 52,631,700	$ 10,526,340	$ 7,518,814	$ 5,263,170	$ 3,508,780
$ 750,000	$ 25,000,000	$ 75,000,000	$ 15,000,000	$ 10,714,286	$ 7,500,000	$ 5,000,000

This spreadsheet represents the amount of extra work required to regain a loss based on profit margins
To change calculated loss, change profit margin % in row 9

What gets inspected gets inspected
What gets measured gets ***results***

Safety – Quality Commonalities

Program	Quality	Safety
Employee orientation	✓	✓
Employee manual	✓	✓
Checklists	✓	✓
Insurance	✓	✓
Incident rates	✓	✓
Incident reviews	✓	✓
Training – Superintendents	✓	✓
Training – Foremen	✓	✓
Training – Trades/Crafts	✗	✓

Do you have a climate where people can report mistakes?

Do you review workmanship errors like safety?

How do people learn from their mistakes?

Inspection Software

PROCORE

Quality & Safety Tools

Discover all the tools you need for the highest quality build in the safest environment.

Daily Log →

Capture everything you need to report to the office.

Contact Directory →

Store an unlimited number of project and vendor contacts.

Documents →

When documents go digital, nothing gets lost.

Forms →

Simple to complex fillable PDF forms at your fingertips.

Incidents →

Digitally capture and manage incidents easily and accurately.

Inspections →

Proactively identify hazards before they injure more than your reputation.

Observations →

Track, assign, and report upon multiple types of observations and corrective actions on the fly.

Photos →

Capture your questions, skills, and results in a snap.

Reports →

Insights to help you analyze every detail.

Schedule →

Minimize confusion with integrated scheduling software.

Tasks

Track and manage every coordination-related step in your process.

Action Plans →

Take action and collaborate on clearly defined plans from one location.

Parallels Safety and Quality

(remember this Chart? – What are we missing?)

Program	Quality	Safety
Employee orientation	✓	✓
Employee manual	✓	✓
Checklists	✓	✓
Insurance	✓	✓
Incident rates	✓	✓
Incident reviews	✓	✓
Training – Superintendents	✓	✓
Training – Foremen	✓	✓
Training – Trades/Crafts	×	✓

Notes:

LOSS Control/claims Management

After the Fact – Defect Claim / Accident

Change checklists to inspection processes

Incident Rates - ???

Incident Reviews - ???

People correct on the job – great for the job; how do we share it

Near miss – near hit – how do we share

Claims review meetings / incident review meetings

(somewhere – construction defect claims - discovery)

Consulting experts for mediation / trial

Industry Associations

Construction Industry Institute

Zero Accidents Task Force High-Impact Zero Injury Safety Techniques

1. Pre-Project/Pre-Task Planning for Safety
2. Safety Orientation and Training
3. Written Safety Incentive Program
4. Alcohol and Substance Abuse Program
5. Accident/Incident Investigations

AIA Contract Doc

Key Components of Quality Control in Construction Contracts

1. Inspection and Testing
2. Doc and Record Keeping
3. QA Plan
4. Training and Certification
5. Sub Management
6. Change Management

Where Implementation Happens

Weekly toolbox talks

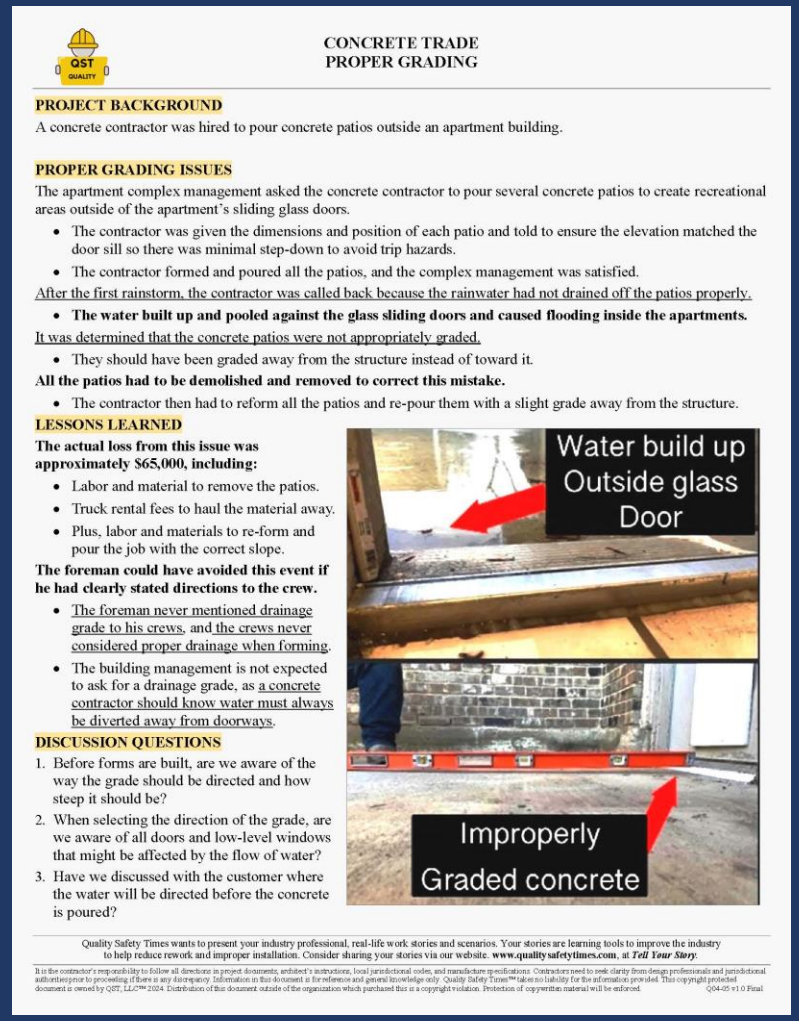
Trade Specific

Phase Specific

Feedback Loops

- What's working
- What's not working
- What went well
- What needs changed

"Not having craft-level quality control meetings is like having a great safety program without crew safety meetings."



CONCRETE TRADE
PROPER GRADING

PROJECT BACKGROUND

A concrete contractor was hired to pour concrete patios outside an apartment building.

PROPER GRADING ISSUES

The apartment complex management asked the concrete contractor to pour several concrete patios to create recreational areas outside of the apartment's sliding glass doors.

- The contractor was given the dimensions and position of each patio and told to ensure the elevation matched the door sill so there was minimal step-down to avoid trip hazards.
- The contractor formed and poured all the patios, and the complex management was satisfied.

After the first rainstorm, the contractor was called back because the rainwater had not drained off the patios properly.

- **The water built up and pooled against the glass sliding doors and caused flooding inside the apartments.**

It was determined that the concrete patios were not appropriately graded.

- They should have been graded away from the structure instead of toward it.

All the patios had to be demolished and removed to correct this mistake.

- The contractor then had to reform all the patios and re-pour them with a slight grade away from the structure.

LESSONS LEARNED

The actual loss from this issue was approximately $65,000, including:

- Labor and material to remove the patios.
- Truck rental fees to haul the material away.
- Plus, labor and materials to re-form and pour the job with the correct slope.

The foreman could have avoided this event if he had clearly stated directions to the crew.

- The foreman never mentioned drainage grade to his crews, and the crews never considered proper drainage when forming.
- The building management is not expected to ask for a drainage grade, as a concrete contractor should know water must always be diverted away from doorways.

DISCUSSION QUESTIONS

1. Before forms are built, are we aware of the way the grade should be directed and how steep it should be?
2. When selecting the direction of the grade, are we aware of all doors and low-level windows that might be affected by the flow of water?
3. Have we discussed with the customer where the water will be directed before the concrete is poured?

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How Do We Get There

- Invest in your People
- Track Re-Work and align goals within the organization
- Budget for craft training (safety and quality)
- Update Pre-task planning forms to include “quality”
- Require “Site specific QC plan” in the RFP
- Include QC into contractor selection processes
- Refocus (cross-train) Safety and Quality Staff
- Update your contract verbiage requiring weekly *Safety & Quality* crew meetings

AIA – “Training and Certifications are a Critical Component of a Contractor’s Quality Control Program”

What Can Safety Professionals Do?

- Know Your Losses
- Know Concerns of Others
- What are Your Controls
- Share Your Gained Knowledge
- Have Your Facts & Recommendations to Improve

Einstein – definition of insanity is doing the same thing over and over and expecting different results

YOUR Marketing Opportunity

- **Assumption – Negotiated**
- **Interview Process**
- **Tell Owner RE-WORK Costs**
- **What are you going to do**

  * Site Specific QA/QC plan
  * Pre Task Plans
  * Pre-Task Plans
  * Weekly Craft QC Topics

Construction Industry Institute

Zero Accidents Task Force

High-Impact Zero Injury Safety Techniques

2. Safety Orientation and Training

AIA Contract Doc

Key Components of Quality Control in Construction Contracts

4. Training and Certification

MY *Marketing Opportunity*

Name one CM, GC or Sub in USA that has Weekly QC Topics for Trades

BUILDING–ROOFING WATERPROOFING TRADE
WATER LEAKAGE–CAULKS AND SEALANTS

WATER LEAKAGE–CAULKS AND SEALANTS PROJECT BACKGROUND

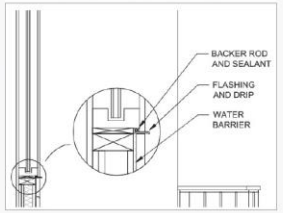
It is not advised that caulk joints be the only means for controlling water from entering a building.

These materials are often the first line of defense for maintaining building water integrity.

- When selecting a caulk or sealant, confirm the product will bond well to the substrate materials it is applied to.
- Also, allow for flexibility if movement is required. How the bead of sealant is applied is very important.

The best quality caulk will fail if applied improperly.

Water Proofing Caulk Details with Specification to Caulk Materials



HOW TO AVOID FAILURES AT CAULK JOINTS

If a caulk joint is located where movement is likely, an hourglass shape about twice as wide as it is deep should be applied.

- This shape allows a caulk bead to stretch without failing by either "adhesion" or cohesion to the substrate below.
- The sealant should be no more than 1/2 inch deep.

For deeper joints, pack the joint with a backer rod.

- Backer rods can be made of either open-cell or closed-cell foam and come in diameters from 1/4 inch to as much as 2 inches.
- In concrete control joints or wet locations, use closed-cell foam.
- Sealing a dirty or flaking joint will fail when the joint moves.
- Confirm the joint is dry unless using a sealant approved for damp surfaces if needed.

To bond to nonporous substrates, using a silicone product is a good idea.

- Silicone bonds well with glass, tile, and metals and is one of the most flexible sealants made.

Butyl rubber is a sealant that bonds well to a range of materials.

- It is a high-quality, rugged, rubber-like sealant that is excellent for exterior jobs requiring a durable, watertight seal. Butyl rubber is not UV-resistant.

Always follow the architects' and engineers' and material specifications.

If you have questions, use the Request For Information process.

Expansion Joints

CAULKS AND SEALANTS: DISCUSSION Q & A

1. Are any of the caulk joints located where movement is likely?
2. Are you installing a caulk that will be exposed to UV light?
3. Do you know the special adhesives or sealants that should be used on this job?
4. Who has confirmed we have the correct sealant per contract specifications?

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www.qualitysafetytimes.com, at Tell Your Story.

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ELECTRICAL LOW-VOLTAGE TRADE
ELECTRICAL CABLE—MATERIAL ORDER ERROR

ELECTRICAL CABLE PROJECT BACKGROUND

An International Airport awarded an Industrial Controls company the contract for a new baggage conveyor system.

- The project included all the controls for all the baggage lines for the entire conveyor system.
- The new baggage conveyor system delivered central routing to the Explosive Detection equipment and outbound Airline Pick Up areas.
- The baggage handling contract was a design-build contract that included the Baggage Handling Control System.

ELECTRICAL CABLE—MATERIAL ORDER ERROR ISSUE

The project was completed and commissioned.

- Months after completion, airport personnel reported baggage control system problems.

The new system was not communicating properly with the central controllers.

- Re-inspection of the wiring connections was completed multiple times, but intermittent problems persisted.

Eventually, an airport technician compared the new contract submittal data for the low-voltage wiring against the new low-voltage wiring installed in the field.

- It was determined that the new low-voltage wiring installed in the field was a different model number from the design-specified low-voltage wiring.

The design-specified model number is related to radio frequency shielding. Airports are high radio frequency locations.

- The newly installed low-voltage cabling did not contain radio frequency shielding.
- It was determined the electrical contractor ordered the wrong cabling.
- The cabling was replaced, and the intermittent problems subsided.

Actual Loss: Approximately $500 K includes the new cable, installation time to correct the system, penalties, and schedule delay costs.

Low-Voltage Control Box

Low-Voltage Control Box

HOW TO PREVENT THESE TYPES OF ISSUES

- All contractors should hold an internal pre-construction meeting to discuss new contract submittals and ensure all materials are ordered according to approved submittals.
- Approved submittals should be forwarded to suppliers. Any questions about specified equipment and materials should be addressed to the engineer of record in writing.
- All contractors should document all variances, no matter how small, through submittals, Requests For Information (RFI), and substitution requests.
- Never change material or equipment orders without prior and proper approval.
- Putting such concerns in writing informs the construction manager and general contractor. Such documentation goes a long way in avoiding disputes and claims and becoming a party involved in a court case.

ELECTRICAL CABLE—MATERIAL ORDER ERROR: DISCUSSION Q & A

1. Are we using internal pre-construction meetings?
2. Does shipping and receiving compare materials received to the ordered material and the project specifications?
3. Is the RFI log updated, and is information transferred to field operations, including shipping and receiving?
4. How would the project supervision or the crew know the roll of wire was correct for the project?

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Your stories are learning tools to improve the industry to help reduce rework and improper installation. Consider sharing your stories via our website.

"Not holding weekly, craft-level trade-specific "quality" trainings is like having a great safety program without weekly safety meetings"

Questions?

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