PREVENTING CONSTRUCTION DEFECTS THROUGH EFFECTIVE QUALITY CONTROL

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Preventing Construction Defects

Effective Quality Control

- Well-administered quality control programs on construction projects can mitigate the incidence and severity of construction defects.
- These defects are costly to repair, interrupt the flow on a project, and lower jobsite morale.
- Defects detected after project completion can result in costly personal injuries and property damage as well as expensive litigation.
- Project owners would be wise to include rigid contractor quality control requirements in their construction contracts.
Preventing Construction Defects

Effective Quality Control

• Quality control specifications on construction projects, commonly found in section 01400, are usually vague and ineffective.

• They put the burden of meeting the contract requirements on the Contractor but don’t specify a plan or an aggregate of activities that would ensure an adequately constructed project.
Effective Quality Control

- The U.S. Army Corps of Engineers and the U.S. Navy have required contractor quality control (CQC) programs for over four decades.
- These programs have specific requirements and have been adopted by many federal, state and municipal agencies.
- In CQC, the Contractor maintains responsibility for contract compliance.
- The Owner provides overall QA or quality assurance to verify the CQC program is effective and enforces the Contractor’s CQC responsibilities.
CQC Programs

The components of a CQC program include many of the controls that are normally present on a construction project but include additional, specific inspection and documentation requirements:

- Quality Control Plan – List of Definable Features of Work
- CQC Organization – Responsibilities and Qualifications
- Preconstruction Conference
- Preconstruction Safety Conference
- Project Schedule – List of Definable Features of Work
- QC Plan Meeting

- QC/QA Coordination Meeting or Mutual Understanding Meeting
- Three Phase Inspection System
  - Preparatory Phase
  - Initial Phase
  - Follow-up Phase
- Safety
  - Daily inspections
  - Activity Hazard Analysis (AHA)
CQC Programs (continued)

- **Quality Control Documents**
  - Contractor Quality Control Daily Report
  - Preparatory Phase Checklist
  - Initial Phase checklist
  - Deficiency List
  - Testing Plan and Log
  - Submittal Register
  - Contractor’s Submittal Transmittal form
  - AHA
- **Submittals**
- **Offsite fabrication testing and inspection**

- **Request for Information**
- **Test Reports**
- **System Test Reports**
- **Training of Personnel in O & M of Equipment**
- **Commissioning**
- **Punch List Inspection**
- **Final Acceptance Inspection**
- **As-Built Drawings**
- **Operation and Maintenance Manuals**
- **Warranties**
- **Turnover of keys and spare materials**
Construction Defect Examples

This photo shows the effect of probable ice damming on a shingle roof system. Plywood or OSB substrate has failed due to water damage.

Note the lack of ice and water shield beneath the shingles and felt. There may also be a ventilation problem. Plumbing vent may not have been shingled properly.
One story brick structure is separating from two story brick structure. There should have been a set back or separation with a soft (caulked) joint between the two structures.
Construction Defect Examples

Longitudinal cracking in this pavement is most likely due to a sub-grade problem or poor joint construction in underlying lifts.

Note that this will amount to a minor nuisance to the driver of a car but could result in a fatal accident to a motorcyclist.
Construction Defect Examples

This is a flue from a fireplace. The arrows point to a breach in the flue where carbon monoxide could escape into the home.

The wood framing also may be too close to the sheet metal and could pose a fire hazard.
Construction Defect Examples

Note the corrosion on the reinforcing steel of this parking garage column. Rebar expands when it rusts and pops off or spalls the surrounding concrete cover.

Typically epoxy-coated rebar is used in cold weather climates where deicing salts are routinely used and where the concrete is exposed to the weather.

Minimum concrete cover must be maintained, usually 1” to 3” depending on the application.
Improperly installed flashing is a leading cause of roof leaks. Note the nail that is loose is not a standard roofing nail.

Cants, which are the beveled edge substrates, used to be made of solid wood. They now are often made of a fiberboard which is a non-structural material.

The vent should not interrupt the flashing. Note the crack developing at the corner under the tarred area.

Rust on the right side may be due to galvanic action caused by dissimilar metals being in contact.
Mold commonly forms on the inside of drywall partitions. If left untreated, mold can cause respiratory problems.

This mold appears to have been caused by water intrusion, either from improperly graded exterior or from interior plumbing on the other side of the wall.

It may also result from a brick masonry wall with improper base flashing and weep system.
Questions?
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