Coordination of Specifications & Drawings

Albuquerque CSI Continuing Education Conference

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Learning Objectives

- Understand the types of information that belong on a drawing vs what belongs within a specification.
- Apply knowledge to identify potential errors or inconsistencies in project documents.
- Translate the relationships of drawing information and specification information into your own words.
- Understand proper use of terminology and identifiers to ensure proper location of information by writer and recognition of requirements by reader.
Drawing/Spec Coordination:

- Difference between Drawings and Specifications – aside from one is graphical and the other textural.
- What information belongs on a drawing and what information belongs in the spec?
- Where to find the requirements for the proper sealant, insulation, or glass type; and where it is located on a project?
Drawing/Spec Coordination:

- Purpose of Construction Documents
- Purpose and function of Drawings in communicating information
- Purpose and function of Specifications in communicating information
- What gets placed in each type of document
- Complementary relationship of Documents
- Terminology consistency - Keynoting and Identifiers
- Checklist systems
Specifications
• Drawings
Specifications Define:

- Define the **qualitative** requirements for **products, materials, and workmanship** upon which the contract is based. They are organized into 49 Divisions.
  - Set requirements for the physical qualities, chemical constituents, and performance
  - Establish standards of workmanship associated with the manufacture and installation of materials, equipment, and components
  - Describe materials in detail.
  - Define the installation requirements.
Specifications: Purpose

- Precise statement describing the characteristics of a particular item (Flat, Plumb, Level).
- Specifications must describe completely materials and fabrication methods.
- WHY SPECS??
Why Specs?
Why Specs?

What is going on behind those eyes?

Why is one shoulder lower than the other?

Why is the right hand on top of the left?

No eyebrows or eyelashes?

Mona Lisa Smile

Bad Hair Day?
Why Specs?
Specifications: Why?

- It is not practical to include sufficient notes on construction drawings to describe in complete detail all of the products and methods needed for a project.

- Specifications are the written contract documents (legal) which define the quality and types of workmanship and materials upon which the construction contract is based.
Drawings:

- Graphic representation of the work.
- Drawings Show:
  - Sizes
  - Forms
  - Shapes
  - Materials
  - Quantities
  - Locations
  - Connections
Drawing Relationship to Specifications:

- Drawings **Identify** Materials
- Specifications **Describe** materials
- Drawings and specs **are Complementary** in Private work - Specs govern in many Public projects.
Drawing Recommendations

- No comprehensive notes
- Do not use excessive notes
- Do not use notes to define work to be done by a specific contractor
- Do not use proprietary names
- No “See Specs” notes
- Drawings Identify - Specifications Describe
Specifications Recommendations

- Provide detailed requirements for:
  - Physical properties
  - Chemical constituents
  - Performance requirements
  - Standards of workmanship

- Do not include information that is more appropriate on drawings (Quantities).

- Do not repeat information shown on drawings.
Drawings Should:

As with the 4 C’s of specifying:

– Be **Clear** - logical placement of graphics and notations
– Be **Correct** - No inconsistencies or discrepancies
– Be **Complete** - Tell the whole story
– Be **Concise** - identify, don’t describe
The 4 C’s of Drawings:

• Be CLEAR

  – Indicate the interrelationships between components and materials (slab edge to wall; continuity of air barriers);
  – Locate each material, assembly, component, and accessory (vapor barrier and insulation in wall)
  – Identify all materials, components, and pieces of equipment (Roof, insulation, walkway - grout in collar joint);
  – Give dimensions of construction and sizes of field-assembled components;
  – Show details and diagrams of connections.
The 4 C’s of Drawings:

- Be CORRECT
  - Identify drawing symbols and abbreviations; GWB, TOS, AC, etc.
  - Use consistent terminology - Consistent with the specifications
  - Use identified generic terminology (hardwood, not oak);
  - Use material identifiers for multiple type products.
The 4 C’s of Drawings:

- **Be COMPLETE**
  - Identify all materials, systems, components, appearance and connections
  - Indicate the extent of alternates
  - Show areas of construction phasing
  - Indicate limits of work
  - Show specific items of work by the owner or separate contractors (NIC; NOT “By Others”)
  - Designate work of separate contracts (multiple prime)
The 4 C’s of Drawings:

- Be **CONCISE**
  - Organize information for the most easily understandable manner
  - Show information only once in the best possible location
  - Show the appropriate information at the appropriate scale (plan, building section, wall section, detail)
  - Use generic information to identify, but not describe a material or component
Drawings Should Not:

- Use overly detailed notes to obscure the drawings and increase the possibility for inconsistencies and duplications; **increases search time**
- Show proprietary product information (Corian)
- Cross-reference to specifications with notes such as "refer to specifications" or "manhole cover - see specifications (use specific notes “**see Section 055000”**)
- Cross-reference to drawings with notes such as ”see structural” (use specific notes “**refer to Detail 6/S3”**)
- Attempt to define the work of specific subcontractors or trades (GC responsibility - where do you stop).
Glazing Systems: Storefronts, curtain wall, windows may be sufficient to find products in spec.

However - How about the following:

- Glass (GL-01, GL-02)
- Sealants (SL-01, SL-02)
- Insulation (INS-01, INS-02)
- Waterproofing (WP-01, WP-02)
- Expansion Joint Covers (EJ-01, EJ-02)
- Metal Panels
- Steel Studs - Division 05 or 09?? - YES
Identifiers or Designators

Glass

- Type **GL-01**: Curtain Wall, Insulating Vision Glass Units, Section 088000
- Type **GL-02**: Laminated Glass for skylight - Section 088000
- Type **GL-03**: Ballistic Glass Level 3 at Judges Chambers Section 088000
- Type **GL-04**: Mirrors, Section 088300 – Frameless glass mirrors at toilet rooms
Identifiers or Designators

Sealant

- **Type SL-01** – Acrylic Latex, Section 079200 – Interior non-moving paintable joints
- **Type SL-02** – Silicone – General Purpose, Section 079200 – Exterior weather seals
- **Type SL-03** – Silicone – Sanitary, Section 079200 – Toilet room joints at wall tile, counters, fixtures, etc.
- **Type SL-04** – Urethane – Traffic Bearing, Section 079200 – Interior floor joints and exterior paving joints
- **Type SL-05** – Acoustical, Section 092900
Terminology:

- Inconsistent terminology creates confusion in preparing drawings and specifications.
- Avoid the confusion caused by inconsistent terminology by using consistent terminology throughout the contract documents
  - gypsum board/gypsum wallboard/sheet rock/drywall.
  - The "service sink" identified in one location should not become the "janitor’s sink" in another
  - The "bituminous surface course" should not become "asphalt topping."
- Inconsistent terminology wastes time and can result in claims, raise construction costs, cause delays, and even produce faulty construction.
# Coordination

## Terminology Differences

<table>
<thead>
<tr>
<th>Non-Preferred Terms</th>
<th>Preferred Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>acoustic calking</td>
<td>acoustic sealant</td>
</tr>
<tr>
<td>acoustical plaster</td>
<td>acoustical finish</td>
</tr>
<tr>
<td>alternative</td>
<td>alternate</td>
</tr>
<tr>
<td>apply</td>
<td>install</td>
</tr>
<tr>
<td>as-built</td>
<td>record drawings</td>
</tr>
<tr>
<td>asphalt roofing</td>
<td>built-up roofing</td>
</tr>
<tr>
<td>backing rope</td>
<td>joint backer</td>
</tr>
<tr>
<td>balestrades</td>
<td>railing</td>
</tr>
<tr>
<td>bar joists</td>
<td>steel joists</td>
</tr>
<tr>
<td>batt insulation</td>
<td>blanket insulation</td>
</tr>
<tr>
<td>blackboard</td>
<td>chalkboard</td>
</tr>
<tr>
<td>block</td>
<td>concrete masonry unit</td>
</tr>
<tr>
<td>calking</td>
<td>sealant</td>
</tr>
<tr>
<td>casing bead</td>
<td>metal trim</td>
</tr>
<tr>
<td>ceiling panel</td>
<td>acoustical panel</td>
</tr>
<tr>
<td>ceiling tile</td>
<td>acoustical tile</td>
</tr>
<tr>
<td>centigrade</td>
<td>Celsius</td>
</tr>
<tr>
<td>computer floor</td>
<td>access flooring</td>
</tr>
<tr>
<td>concrete block</td>
<td>concrete masonry unit</td>
</tr>
<tr>
<td>cork tackboard</td>
<td>tackboard</td>
</tr>
<tr>
<td>corkboard</td>
<td>tackboard</td>
</tr>
<tr>
<td>corrugated deck</td>
<td>steel roof deck</td>
</tr>
<tr>
<td>crushed stone</td>
<td>porous fill</td>
</tr>
<tr>
<td>delta</td>
<td>Use symbol (see Symbols Module)</td>
</tr>
<tr>
<td>dirt</td>
<td>earth</td>
</tr>
<tr>
<td>domelite</td>
<td>plastic skylight</td>
</tr>
<tr>
<td>drywall</td>
<td>gypsum board</td>
</tr>
<tr>
<td>electro-pneumatic</td>
<td>pneumatic electric</td>
</tr>
</tbody>
</table>
Words versus Graphics:

- **Both** the drawings and the specifications are needed to fully describe a construction project.
- **Say it once and put it in the proper place.**
  - From general to more specific
  - general-General-GENERAL
  - Building section, wall section, detail
  - Submittals - General (Div 01); Submittals Specific - in Product section.
Specifications Should:

- Address the Contractor - not subcontractors; not trades; not suppliers;
- Provide detailed information (versus generic for drawings);
- Use consistent terminology; (trim, border, stop)
- Be coordinated with Drawings;
- Be coordinated with Division 01 (testing, submittals);
- Include the correct use of words and grammar;
- Designate the product in the proper place (MasterFormat);
Specifications Should:

- Say it once and put it in the proper place; (AIA A521 Uniform Location of Subject Matter (2012) – FREE DOWNLOAD)
  - Follow the Three-Part Section Format:
    - PART 1  GENERAL
    - PART 2  PRODUCTS
    - PART 3  EXECUTION
- Be properly edited (every word, line, and paragraph);
- Be coordinated with consultants (Division 01, Power for motors & electronics, access panels, firestopping)
Specifications Should:

- Use the four C’s for effective communication:
- **BE CLEAR** - Use correct grammar and simple (short) sentence construction to avoid ambiguity. Carefully select words that convey exact meanings. Rebuild wall with loose brick.
- **BE CORRECT** - Present information accurately and precisely.
- **BE COMPLETE** - Do not leave out important information (flame spread).
- **BE CONCISE** - Eliminate unnecessary words, but not at the expense of clarity, correctness, or completeness (streamline; imperative mood).
Specifications Should Not:

- Include information which belongs more appropriately on the drawings, such as quantity, capacity, and location;
- Be based on previous project specs that are "just-like" this project;
- Retain "just-in-case" information not required for project;
- Define work of subcontracts;
- Use abbreviations with multiple meanings (AC, ID).
What are Specifications??

Oh no! We're out of specifications!
Documents generally reviewed at 50% and 90% completion stages

Check coordination of information:

- Within project manual
- Within drawings of each separate discipline
- Between drawings of each separate discipline
- Between specifications of each separate discipline
- Between the project manual and drawings
• Review final construction documents

• Check for the following:
  – Verify that all previously noted inconsistencies, errors, and inaccuracies have been corrected
  – Verify that construction documents are complete
    • Check project manual table of contents
    • Check drawing table of contents
  – Verify consistency of all tables
Use only industry recognized terms

Be consistent

Use Uniform Drawing System (UDS) Module 5 and Specifications as a guide

Be consistent

Abbreviations:

- Use abbreviations where space is limited
- “When in doubt, spell it out”

Be consistent
According to AIA Document A201, *General Conditions of the Contract for Construction*, Section 1.2.1:

“The Contract Documents are complementary, and what is required by one shall be binding as if required by all;...”
According to a NASA contract clause:

“Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both.”

“In case of difference between drawings and specifications, the specifications shall govern.”

“In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing.”
## “Un”coordination Example

<table>
<thead>
<tr>
<th>Detail on the Drawings</th>
<th>Horizontal Sliding Metal Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words on the Detail</td>
<td>Double-Hung and Fixed Window</td>
</tr>
<tr>
<td>Specifications Table of</td>
<td>Wood Casement Windows</td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>Title of the Section in the</td>
<td>Fire Rated Aluminum Windows</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>Product specified in the</td>
<td>Steel Windows</td>
</tr>
<tr>
<td>Section</td>
<td></td>
</tr>
</tbody>
</table>
**Responsibility:** One person should be assigned as coordinator and have responsibility for reviewing documents.

- Instructor’s Suggestion: Use someone not closely tied to the project.

**Checklists:** Used to make sure information in the specifications are consistent with the drawings, and drawings do no duplicate specifications.

- MasterSpec® provides drawing and specification checklists
Coordination:

- Drawings and specifications are complementary
  - Questions of precedence between drawings and specifications should not occur.
  - The conditions of the contract should indicate only that in a case of conflict between drawings and specifications, the A/E will make a written interpretation.
  - Specifications supplement, but should not repeat, information shown on the drawings nor should the drawings repeat information contained in the specifications.
    - The drawings may include schematic diagrams showing such things as mechanical and electrical systems. They may also include schedules of structural elements, equipment, finishes, and other similar items.
Coordination:

- Duplication creates opportunity for error.
  - Possibility for RFI
  - GC will assume lower cost
  - Change order

- Detailed information should be reserved for the specifications so that minor changes during development of the documents can be accommodated by revising only the specifications.

- Properly prepared drawings and specifications should dovetail like a snugly fitted jigsaw puzzle, without overlaps (redundancy) or gaps (omission).
Schedules:

- Schedules efficiently organize complex information and help simplify communication by presenting data in a tabular form or in a matrix.
- The location and content of schedules may be included in either the drawings or the specifications; **NOT BOTH**. (Hardware, doors, finishes)
- When placed in a specification section, schedules are located at the end of PART 3.
Using Checklists:

- Checklists help to ensure the following:
  - Necessary items are included in the specifications
  - Specified items are consistent with the drawings
  - Drawings do not duplicate the specifications.
  - Properly prepared specifications to produce clear, concise, complete, and correct project information.

- Edit checklists to suit the particular project.

- Checklists do not eliminate need to understand principles of specification writing.
  - Masters are only tools that require competence, skill, and experience for proper use.
End of Session

That’s All Folks!

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