CPM AND THE SUBMITTAL SCHEDULE

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WHAT IS A SUBMITTAL SCHEDULE?

- A list of submittals expected by the Owner. Or …….

- A group of activities within the CPM Schedule to track all submittals through their progression of preparation by the Contractor and approval by the Owner before the materials and/or equipment can be ordered, and how they affect the construction progress. Or …….

- A little bit of both
THE TERM “SCHEDULE” USED IN TYPICAL AIA SPECIFICATIONS

- Progress Schedule
- Wage Rate Schedule
- Bid Schedule
- Equipment Schedule
- Schedule of Values
- Meeting Schedule
- Delivery Schedule
- Fabrication Schedule
- Submittal Schedule
- Finish Schedule
- Shut-Down Schedule
- Unit Prices Schedule
- QA/QC Schedule
- Parts Lists (within Shop Drawings)
- HVAC Equipment Schedule

- Implementation & Termination Schedule
- Schedule of Maintenance Material Items
- Maintenance & Service Schedule
- Close-Out Schedule
- Instructional, Demonstration & Training Schedule
- Administration Schedule & Forms
- Schedule of Principal Product
- Schedule of Air Samples (Abatement)
- Paint Schedule
- Door Schedule
- Panel Schedule
- SWPPP Schedule
- And on, and on, and on……….
“Schedule” is Defined As:

1. A plan of procedure, usually written, for a proposed objective, especially with reference to the sequence of and time allotted for each item or operation necessary to its completion: *The schedule allows three weeks for this stage.*

2. A series of things to be done or of events to occur at or during a particular time or period: *He always has a full schedule.*

3. A timetable.

4. A written or printed statement of details, often in classified or tabular form, especially one forming an appendix or explanatory addition to another document. *Obsolete.*

5. A written paper.
**WORLD ENGLISH DICTIONARY**

**SCHEDULE (ˈsɛdjuːl, ( esp US ) ˈskɛdʒʊəl)**

- **noun**
  1. a plan of procedure for a project, allotting the work to be done and the time for it
  2. a list of items: *a schedule of fixed prices*
  3. a list of times, esp of arrivals and departures; timetable
  4. a list of tasks to be performed, esp within a set period
  5. *law* a list or inventory, usually supplementary to a contract, will, etc
  6. **on schedule** at the expected or planned time

- **verb**
  - to make a schedule of or place in a schedule
  - to plan to occur at a certain time

[C14: earlier *cedule, sedule* via Old French from Late Latin *schedula* small piece of paper, from Latin *scheda* sheet of paper]

**Word Origin & History**

**schedule**

1397, sedule, cedule "ticket, label, slip of paper with writing on it," from O.Fr. cedule, from L.L. schedula "strip of paper," dim. of L. schida "one of the strips forming a papyrus sheet," from Gk. skhida "splinter," From stem of skhizein "to cleave, split" (see shed (v.))

WHAT DOES A CPM SUBMITTAL SCHEDULE LOOK FOR?

- The submittal process is progressing and all required submittals are being forwarded for review in a timely manner.

- The Owner’s Representatives are processing and approving submittals in a timely manner in order to allow the materials and equipment to be ordered, purchased, and delivered to the project site.

- The key materials and equipment required to build the project will be ordered, fabricated, and delivered without impacting the CPM Schedule.
WHO IS RESPONSIBLE FOR SUBMITTALS

- The Contractor is ultimately responsible for the timely submittal process.

- However, Owners, Architects, and Engineers need to be responsible for assisting the Contractor in timely review, rejection, and resubmittal process.

- The Project Team needs to work together to ensure the Submittal Process DOES NOT IMPACT the Construction Progress.
TEAMWORK

Many times Teamwork and Cooperation cease to exist when dealing with Submittals & Schedules

- Contractors fail to review submittals often wasting the Architectural Team’s time with submittals not meeting the specification requirements

- Architectural Teams let nearly all of the Review Period pass before starting the review, losing valuable time if Resubmittal is Required.

- Requests for Information, Responses, and Rejected Submittals sent on a Friday via slow delivery instead of sending email, fax, or even a courtesy phone call
## SUBMITTAL:
TO PRESENT FOR THE APPROVAL, CONSIDERATION, OR DECISION OF ANOTHER OR OTHERS:

### Typical Submittals
- Product Data
- Shop Drawings
- Samples
- Qualifications
- Certifications
- Maintenance Recommendations
- Design/Calculations
- Working Drawings
- Mix Designs
- Test Reports
- LEED Documentation
- Manufacturer’s Instructions
- Etc. .......

### Deferred Submittals
- Curtain Walls
- Stairs
- Trusses
- Fire Sprinkler Systems
- Elevators & Lifts
- Etc.
CRITICAL SUBMITTALS

- The use of the terms “critical” or “non-critical” within the submittal schedule becomes confusing when dealing with CPM.

- Instead prioritize the submittals:
  - **High**
    - High priority submittals either on or will affect the Critical Path
      - needed in the beginning of the project
      - Have extremely long lead time
  - **Medium**
    - Medium priority submittals are not on the critical path, but are needed in the near future
  - **Low**
    - Low priority submittals are not needed until later in the project (finishes)

- Submittal Priority can be separated and sorted by using activity codes.
# Submittal Activities

## My Typical Submittal Activities
- Prepare
- Review & Approval
- Fabrication and/or Order
- Delivery ($)

## Additional Submittal Activities
- Resubmittals
- GC Review Between Submittal & Returns
- Shipping (Travel Time)
- Additional Review & Approval for Deferred Submittals
NUMBER OF ACTIVITIES

Submittals:
- Product Data
- Shop Drawings
- Samples

Activities for Each Submittal:
- Prepare
- Review & Approve
- Fabrication/Order
- Delivery

16-23 CSI Divisions
12 Submittals per Section
132 Typical Sections
1584 Submittal Schedule Activities
SUBMITTAL SCHEDULE

Definition 5: a list or inventory, usually supplementary to a contract, will, etc

- List all required submittals in every section in separate software (Excel, Oracle Contract [Expedition], Word, etc.)

- Track all submittals for what is required by the subcontractor, submitted for review, and when approved. Also track resubmittals easily until full approval by the Architect/Engineer.

- Review All Specified Submittals with the Architect/Engineer in order to eliminate non-applicable submittals listed in the specifications.
**SUBMITTAL SCHEDULE ACTIVITIES**

Definition 4: a list of tasks to be performed, esp within a set period - or Part of CMP Schedule

- Group submittals within a specified section together and create schedule activities within the CPM to tie into the Project Schedule

- Create additional submittal groups within the same specification section for specific material/equipment you wish to track (e.g. Kitchen Equipment and Walk-In Coolers)

- Optional Order/Delivery Activities if the materials are readily available and can be picked up or delivered within a short period. (within 1-2 weeks)

16-23 CSI Divisions
1 Submittal per Section
132 Typical Sections
528 Submittal Schedule Activities
GROUPING ACTIVITIES WITHIN A SECTION

- Prepare CMU Product Data
- Prepare CMU Shop Drawings
- Prepare CMU Samples

Instead of 3 Separate Activities

Create a Single Activity

- Prepare CMU Submittals
Prepare Structural Steel Shop Drawings

Review & Approve Structural Steel Shop Drawings

Fabrication Structural Steel

Delivery Structural Steel $$$

Pour Concrete Foundations

Crane Set Up & Prep

Cure Time Foundations

Install Structural Steel
Specifications often prohibit cost loading submittal activities including:

- Creation of Shop Drawings
- Engineering Costs
- Administration Costs
- Production Costs

However, many specifications allow for the payment of Material and/or Equipment when Delivered to the Project under Special Conditions
DELIVERY ACTIVITIES

- Have a Single Day Activity for the Delivery of Materials and/or Equipment that can hold the costs associated and allow the Contractor to Bill for the Materials and/or Equipment

Example:

<table>
<thead>
<tr>
<th>Activity:</th>
<th>Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare Structural Steel Shop Drawings &amp; Submittals</td>
<td>$0</td>
</tr>
<tr>
<td>Review &amp; Approve Structural Steel Shop Drawings &amp; Submittals</td>
<td>$0</td>
</tr>
<tr>
<td>Fabrication Structural Steel</td>
<td>$0</td>
</tr>
<tr>
<td>Delivery Structural Steel</td>
<td>$835,250</td>
</tr>
</tbody>
</table>
TIMING OF DELIVERIES

- Best to have Just in Time (JIT) deliveries
- Some long lead items may need to be delivered early and stored on site or a close by storage facility
- Drywall or other large materials and/or equipment should be delivered before closing up of the building or large open spaces
- Link your deliveries to the CPM activities when you need them and when delivery can be accepted
ALLOW FOR RESUBMITTALS?

- What if a Submittal is Rejected, Sent Back for Corrections, and Required to be Resubmitted?
  - What is the Time Impact to the Delivery and Installation?
  - Can the Engineer work out a resolution with a phone call or face-to-face meeting with the Subcontractor?
  - How much time will be lost on a High Priority Submittal from Rejection to Make Corrections to New Review to Final Approval
  - Can fabrication begin or is it halted?
DEFERRED APPROVAL BY A GOVERNMENT AGENCY

- Required Approval from Agency as a process of the Building Permit

  - Is it required to be approved by the Architect/Engineer prior to submittal to the Agency?

  - How to estimate the OD for a Government Agency

    - DSA – Specs state 6 weeks,
      - Personal Experience Minimum 8-12 weeks
DSA APPROVAL
CURTAIN WALLS

469 Days for Final DSA Approval
**Schedule Maintenance**

- Provide Actual Dates when All Submittals within a Group are actually started/finished.
- Provide the remaining duration for Review activities using the remaining time allowed in the specification.
  - If the specified review period is 18 days and the Architect/Engineer has had the submittal for 15 days – RD = 3 Days
- Do Not Shorten Order/Fabrication activities in order to reduce negative float
  - Negative Float in Submittal Activities should be Lights & Sirens for the Project Team
SCHEDULE UPDATE
WITH SUBMITTALS IN TROUBLE

Data Date: 01JUL12

[Diagram of schedule update with submittals in trouble]
CHANGE ORDERS

- Include the submittal process and delivery of newly required materials/equipment in your fragments in order to demonstrate additional time that may be needed for delivery and how it may affect the overall project and critical path.
COST PROJECTIONS & EARNED VALUE

Using “Just in Time” Deliveries, how is your Earned Value and Projected Project Costs going to be reflected correctly?

- Metal Studs & Drywall Submittals Completed:
  - Day 92
- Order & Delivery for Metal Studs & Drywall:
  - 14 Days
- Desired Delivery – After Slab on Deck & Start Layout
  - Day 156
- Early Scheduled Delivery Variance
  - 50 Days
COST PROJECTIONS & EARNED VALUE

- Casework Submittals Complete: Day 121
- Fabrication Casework: 60 Days
- Start Installation Casework: Day 271
- Early Delivery Variance: 90 Days
Month 7 - Heavy with Delivered Materials & Equipment

Materials & Equipment Spread Across Several Months Closer to Time for Installation
Cost Projections & Earned Value

**Without Lag**

- Order, Fabrication, and Delivery Activities are able to Start after the Submittals are Approved.
- Projected Cost and Earned Value figures are calculated on an Early Start that is **Inaccurate** because Delivery is indicated Months Earlier Than Actually Needed.
- Projected Early Start Dates will remain on the Data Date during Schedule Maintenance; Extending when the Material and/or Equipment will be delivered and payment expected after Each Update.

**With Lag**

- Order, Fabrication, and Delivery Activities wait to start until a date later in the project closer to when the Material and/or Equipment will be Actually Needed, but allowing realistic time needed for the fabrication & delivery.
- Projected Cost and Earned Value figures are calculated on more realistic dates of when the Material and/or Equipment will be delivered to the Project Site.
HOW TO CREATE LAG?

Using a Lag in the Predecessor’s Finish/Start Relationship

<table>
<thead>
<tr>
<th>Predecessor</th>
<th>Successor</th>
<th>Type</th>
<th>Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review &amp; Approve Metal Stud Framing &amp; Drywall Submittals</td>
<td>Order Delivery Metal Studs &amp; Drywall</td>
<td>FS</td>
<td>+90</td>
</tr>
</tbody>
</table>

The Lag can be Adjusted During Schedule Maintenance in order to Reflect a Realistic Delivery Date
HOW TO CREATE LAG?

Using Logical Relationships When the Material and/or Equipment Will Be Ready for Delivery
IS THERE A RIGHT OR WRONG WAY?

That Would Depend on Who You Ask:

You would have 3 choices:

- Have no lag on the Fabrication/Order/Delivery activities and constantly have inaccurate Early Start dates, affecting both the material and/or equipment delivery dates and projected costs

- Create a lag within the relationship between the predecessor and successor activity giving what would be the best guess of the time between approval of the submittal and when the material and/or equipment should be ordered and delivered

- Create logic relationships between actual work activities and the Fabrication/Order/Delivery activities giving an approximate dates when material and/or equipment should be Ordered/Delivered depending on progress in the field
BEST PRACTICES

- Contractor should work to complete all submittals as early as possible (within the first 25% of the project duration)
- Remove ambiguous terminology that can be defined differently by different parties
- Prioritize submittals by when the materials and/or equipment are needed and the duration of the order/fabrication/delivery time
- Group submittals in the CPM by specification unless separate tracking is needed
- Be sure the schedule is not over-burdened with submittal activities in proportion to the actual work activities
- Track all submittals separately from the CPM in order to document the complete submittal process
- The Project Team should work together in ensuring all submittals are approved as early as possible to ensure materials & equipment are ordered/delivered so as to not impact the project
- Work with Subcontractors/Suppliers on Realistic Delivery Durations after Submittals are Approved
- Provide appropriate time for review of the submittals by the Architect/Engineer (or as specified)
- Cost loading of submittal schedule activities should be on Delivery Activities Only, preparation of submittals and administrative costs should not be loaded into preparation activities.
- Schedule maintenance should ensure Submittal activities are correctly tracked
- Do Not manipulate the delivery durations in order to reduce Negative Float.
- Negative Float on Submittal/Delivery Activities should Sound Off Alarms to the Project Team
- Once submittals are approved, Order/Fabrication/Delivery activities should be lagged in order to reflect a Realistic Cost Projection and Earned Value
QUESTIONS?