

# What They Don't Teach in Construction Management 101 “Dealing With Change”



**Create Tomorrow Together**  
**2008 CSU FACILITIES MANAGEMENT CONFERENCE**

## **The Situation-Unforeseen Conditions Change**

- Building Renovation Project
- After Start of Demo. Contractor Discovers HVAC Duct Work Conflict with Framing Details.
- This Generates an RFI and Response Requires Design Modification.
- Contractor Believes There Will Be a Time Impact and Gives Notice of Such.

## Added Scope and Time Elements

- A/E Makes Site Visit.
- A/E Develops Design Solution.
- A/E or CM Issues CRB.
- Contractor Develops Cost Estimate for Added Scope.
- Contractor Develops Time Impact Analysis to Demonstrate Delay and Entitlement.

## Added Scope and Time Elements

- CM Reviews CPE / COR and Negotiates Cost with Contractor.
- CM Reviews TIA Submitted By Contractor.
- CM and Contractor Agree to Cost.
- FRAGNET Incorporated Into Schedule for Time Impact.
- Change Order Issued and Contractor Begins Work.



# The Baseline Schedule

- **In Dealing with Change and Delays Your Best Tool is a Good Baseline Schedule.**
  - All Future Time Management Options Depend on the Baseline
  - It is Your Strategic Plan
  - The Updates are Your Tactical Plans
    - ❖ D-Day and D-Day + X Days / Weeks / Months

# Contract Requirements

***Consider the Complexity of Your Project!!***

- **GC's 4.16 is Less Stringent**
  - ***Not Smaller But Less Complex Projects***
- **Supplementary GC's 4.16 is More Stringent**
  - ***Not Larger But More Complex Projects***

## Baseline Review

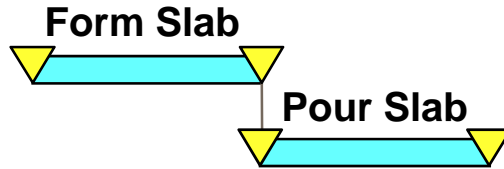
- Do Thorough and Detailed Review of Baseline
- Do Not Allow Sequestering of Float
  - ***Through Logic and Constraints***
- Check Near Criticality
  - ***Not More Than 20% of Activities with 5 Working Days of Float***
- Do Not Allow Compound Activities
  - ***Activities Containing Multiple Trades***
- Check Excessive Float
  - ***Float Value > 40% of Project Duration***

## Relationship Types

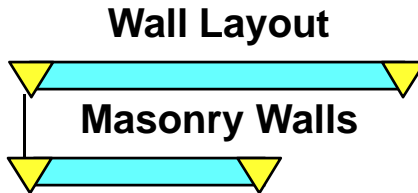
- Minimize Use Of Non-Conventional Logic
  - ***Aim For Majority of Logic To Be Finish To Start.***
    - ❖ ***Finish To Start (FS) = An Successor Activity Cannot Start Until Its Predecessor Activities Finishes***

# Relationships Types

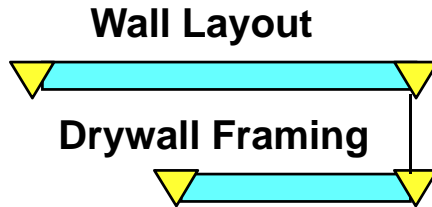
- Finish to Start



- Start to Start

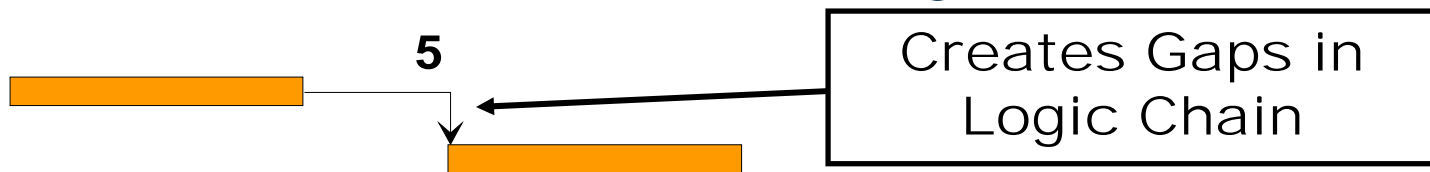


- Finish to Finish

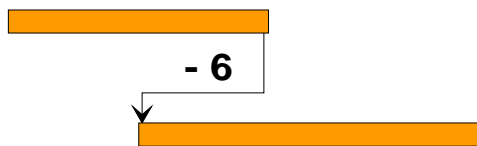


# Relationship Lags

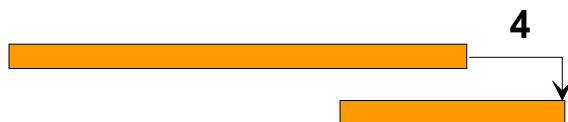
- Finish to Start, with Positive Lag



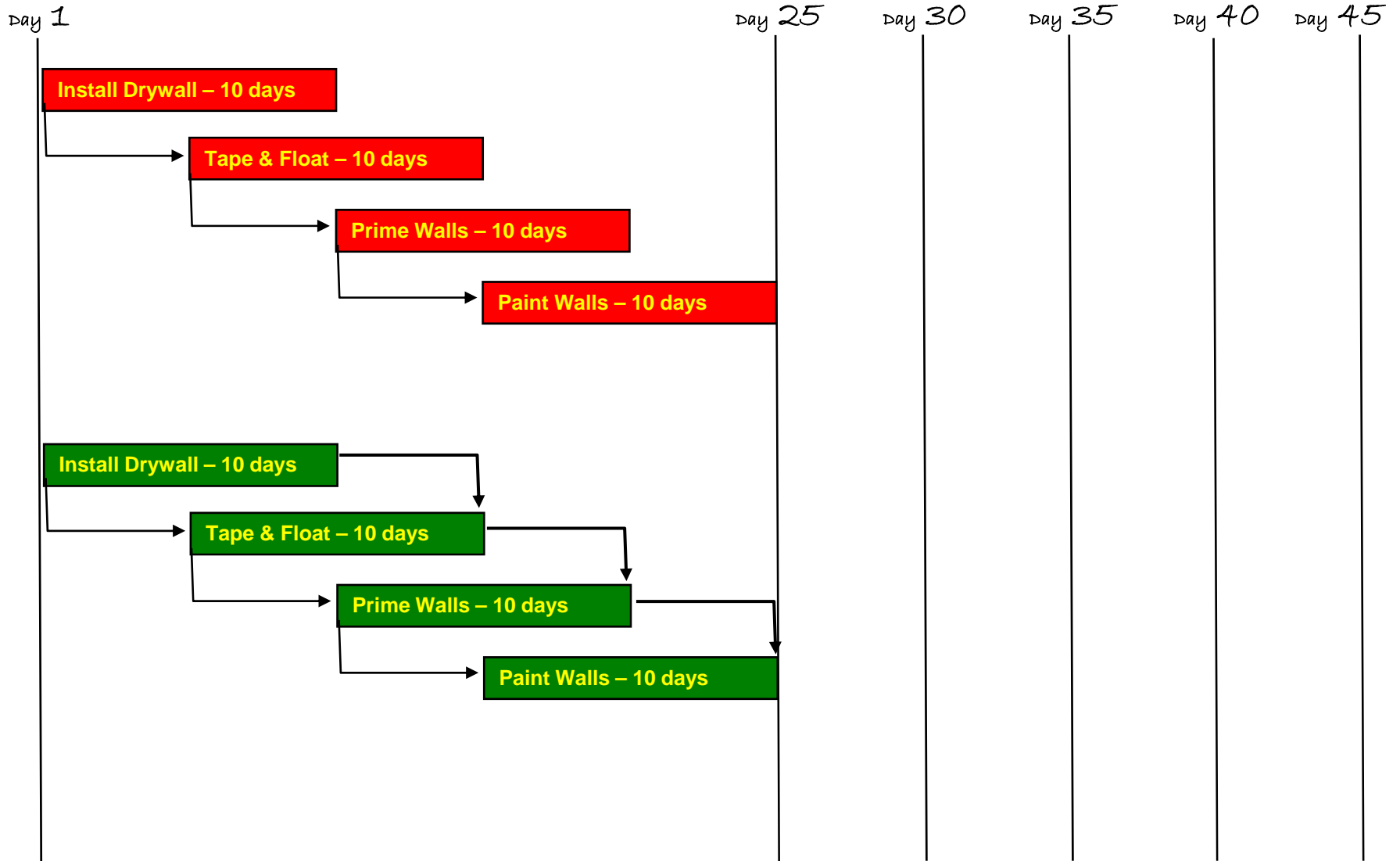
- Finish to Start, with Negative Lag

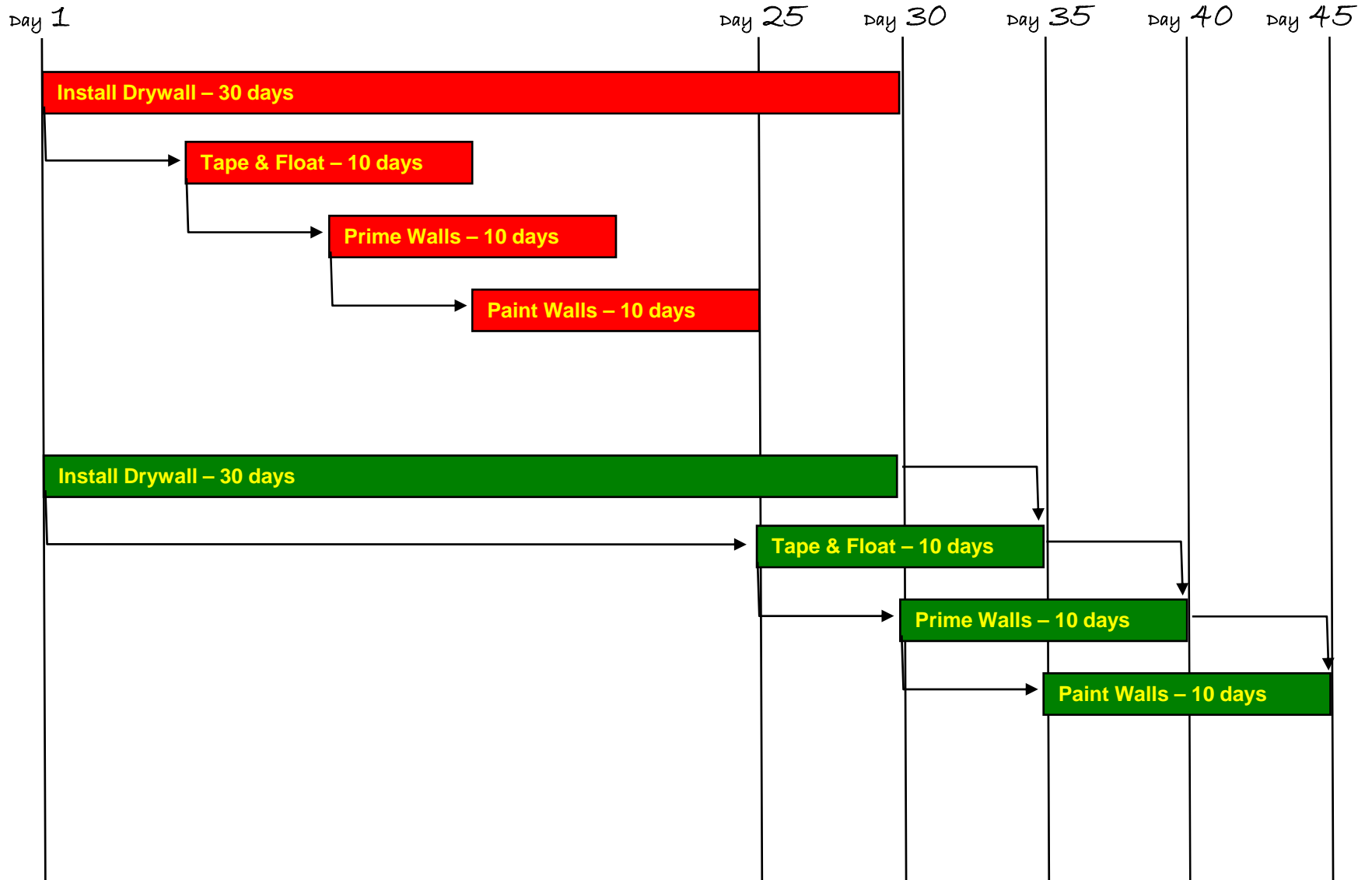


- Finish to Finish, with Positive Lag



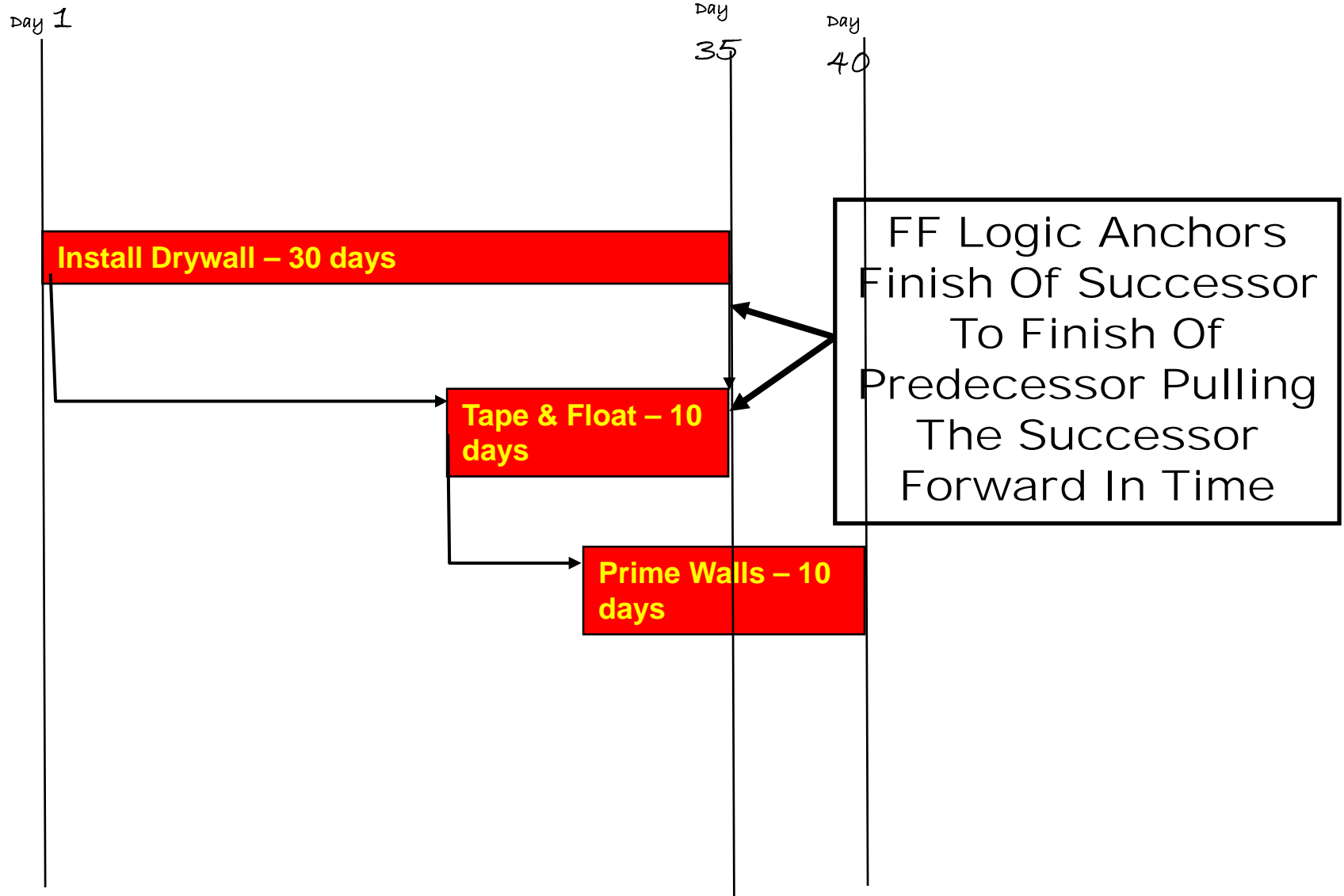
# **Unconventional and Unbalanced, or Uncoordinated Logic**

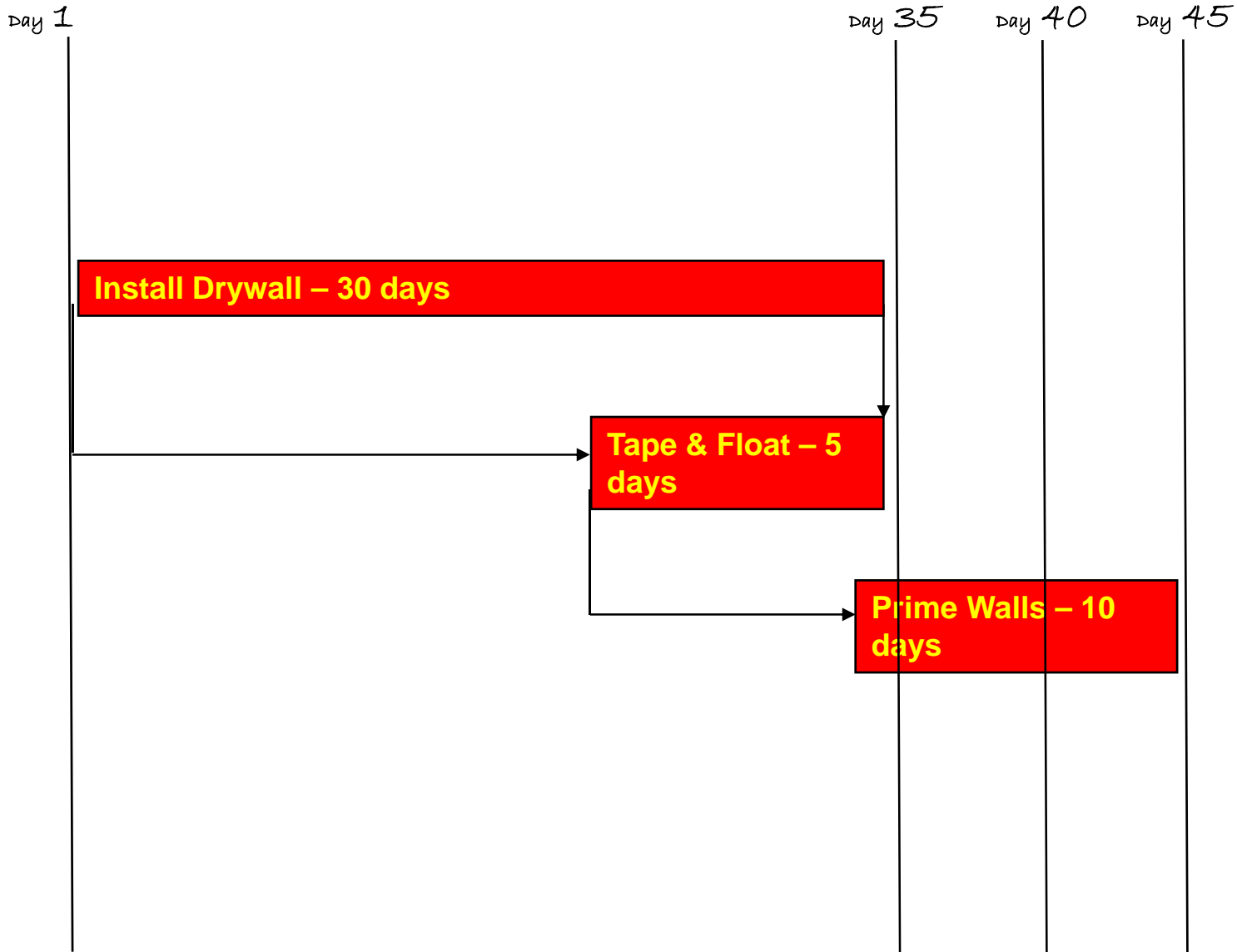




# Reverse Critical Path

- **With Unconventional Logic, Even If The Logic Is Properly Coordinated Its Use Can Have Drastic Effects When Original Durations Are Revised**







Day 1

Day 35

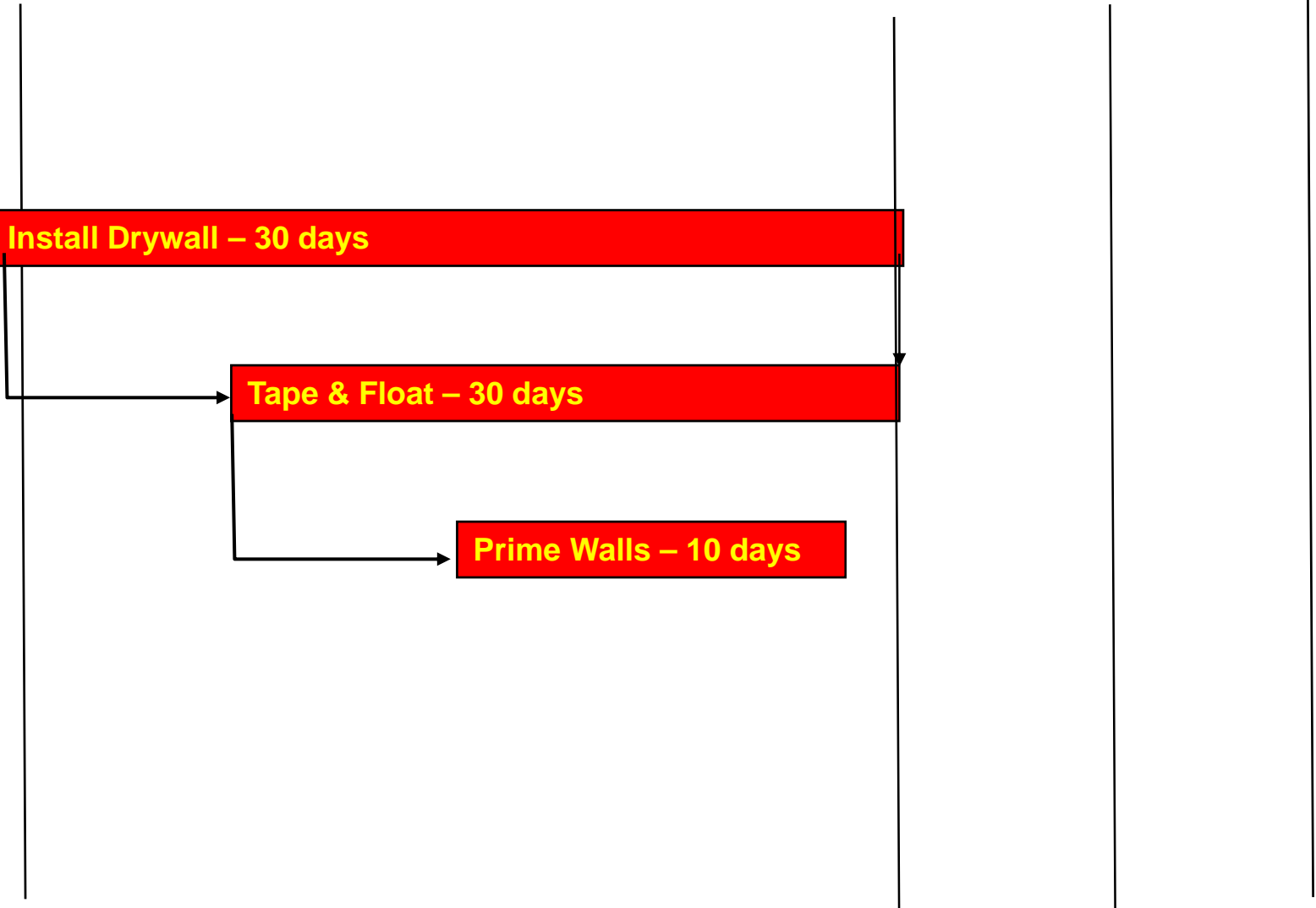
Day 40

Day 45

Install Drywall – 30 days

Tape & Float – 30 days

Prime Walls – 10 days



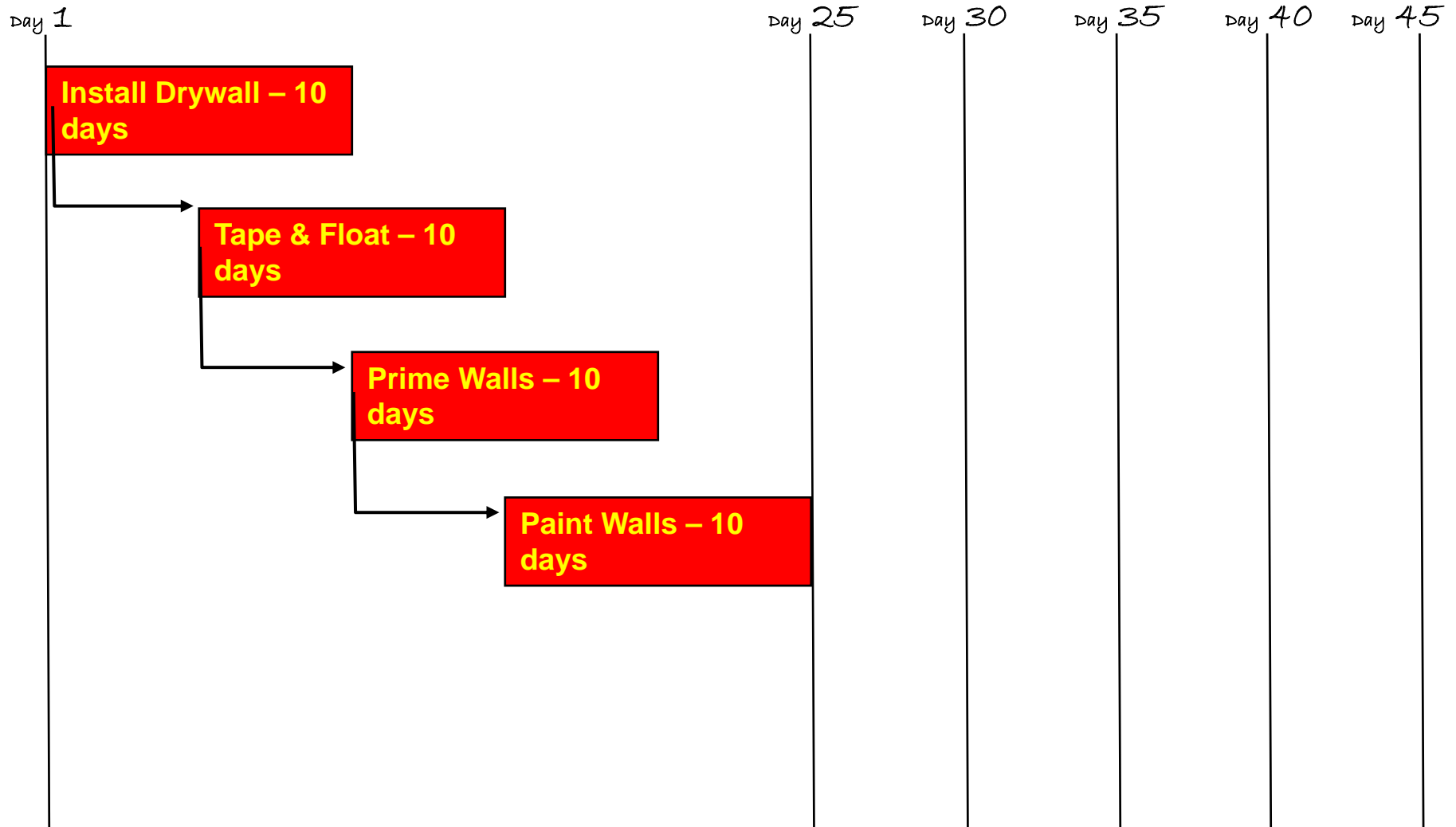
# Constraints and Their Effect

## •Types

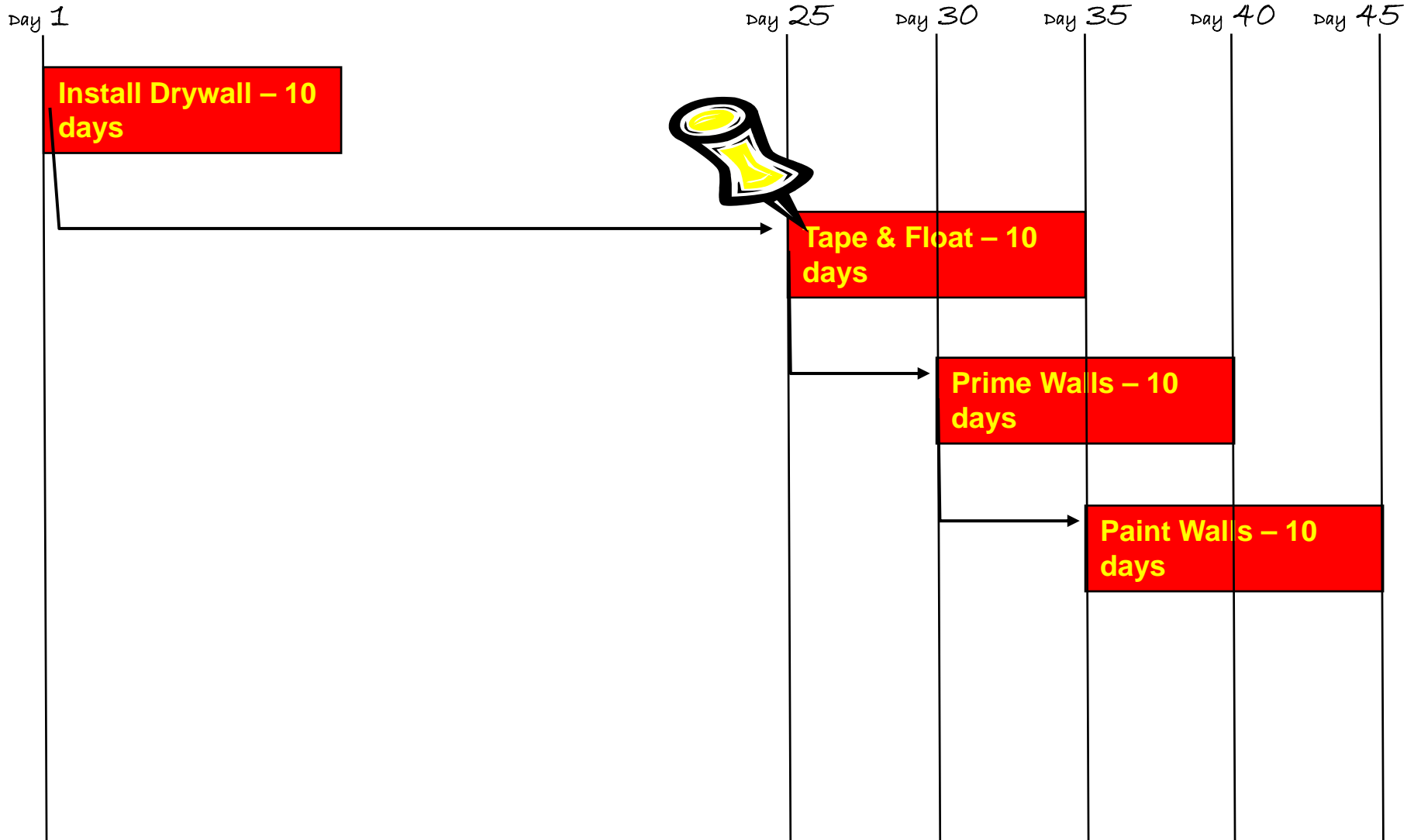
- *Date – Anchors Start or Finish Dates*
- *Float – Forces Criticality Without Reference To Start and Finish Dates*
- *Resource – Deal With Number of Crews of Single Trade*

✓ *(Contractor's Means and Methods)*

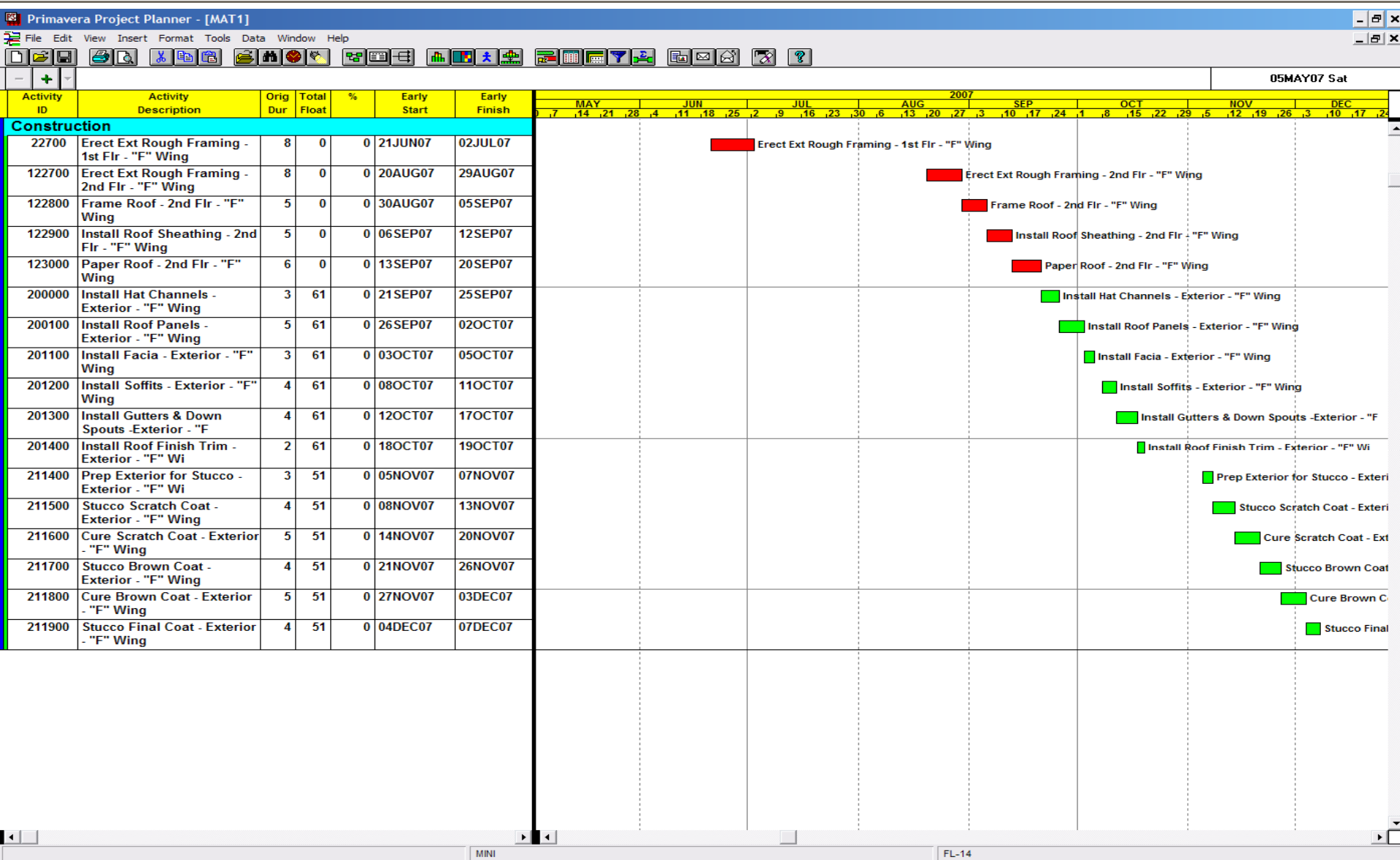
# Date Constraints



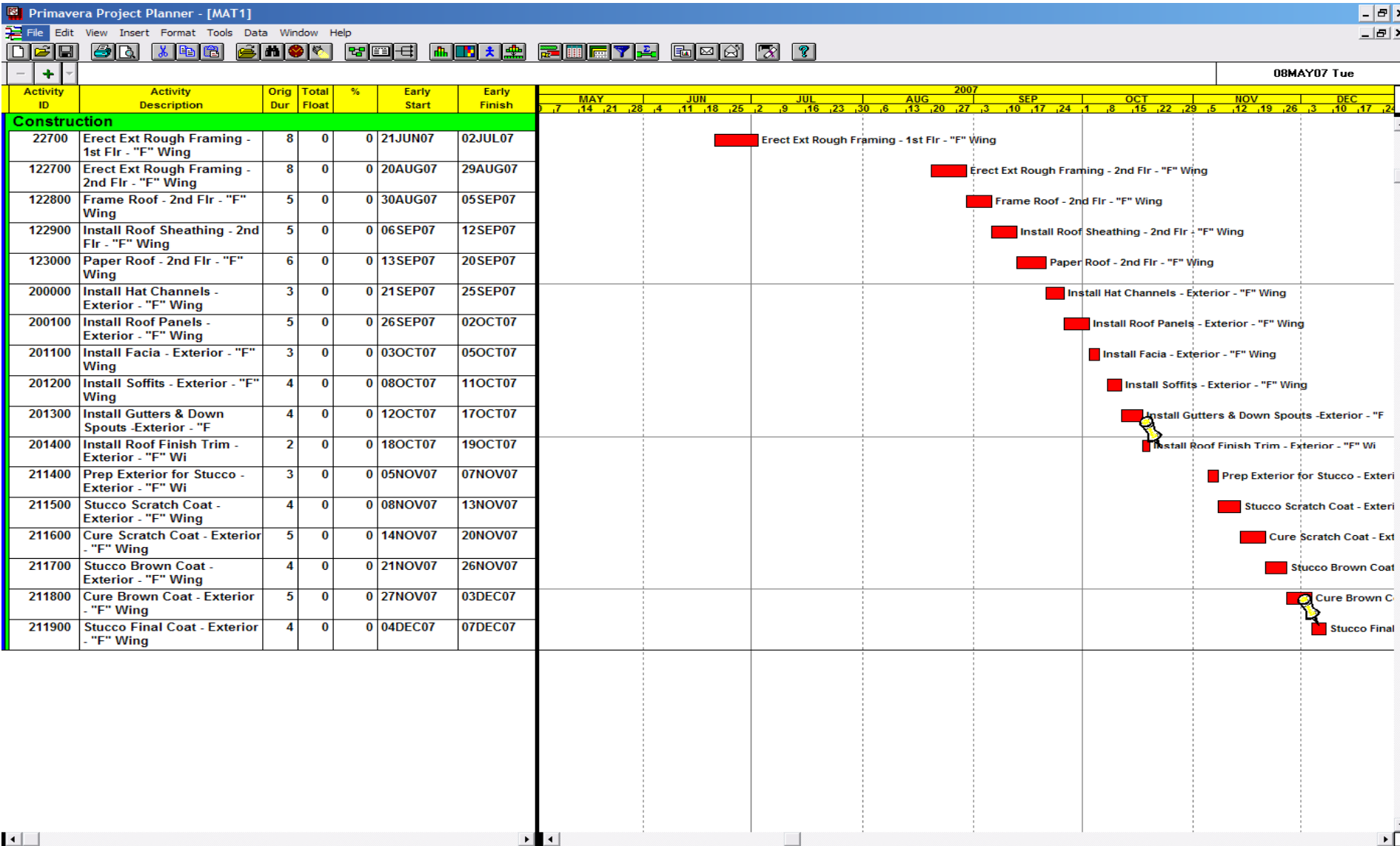
# Date Constraints



# Float Constraints



# Float Constraints



## Resource Constraints – Their Role in the Schedule

Install Drywall – Bldg 1

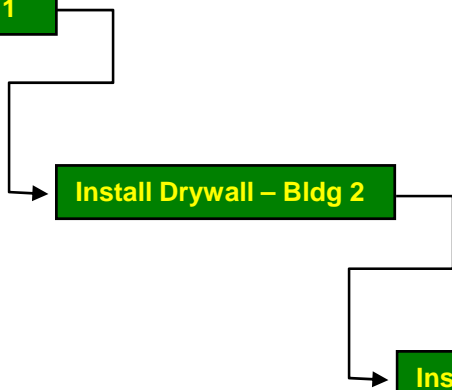
Install Drywall – Bldg 2

Install Drywall – Bldg 3

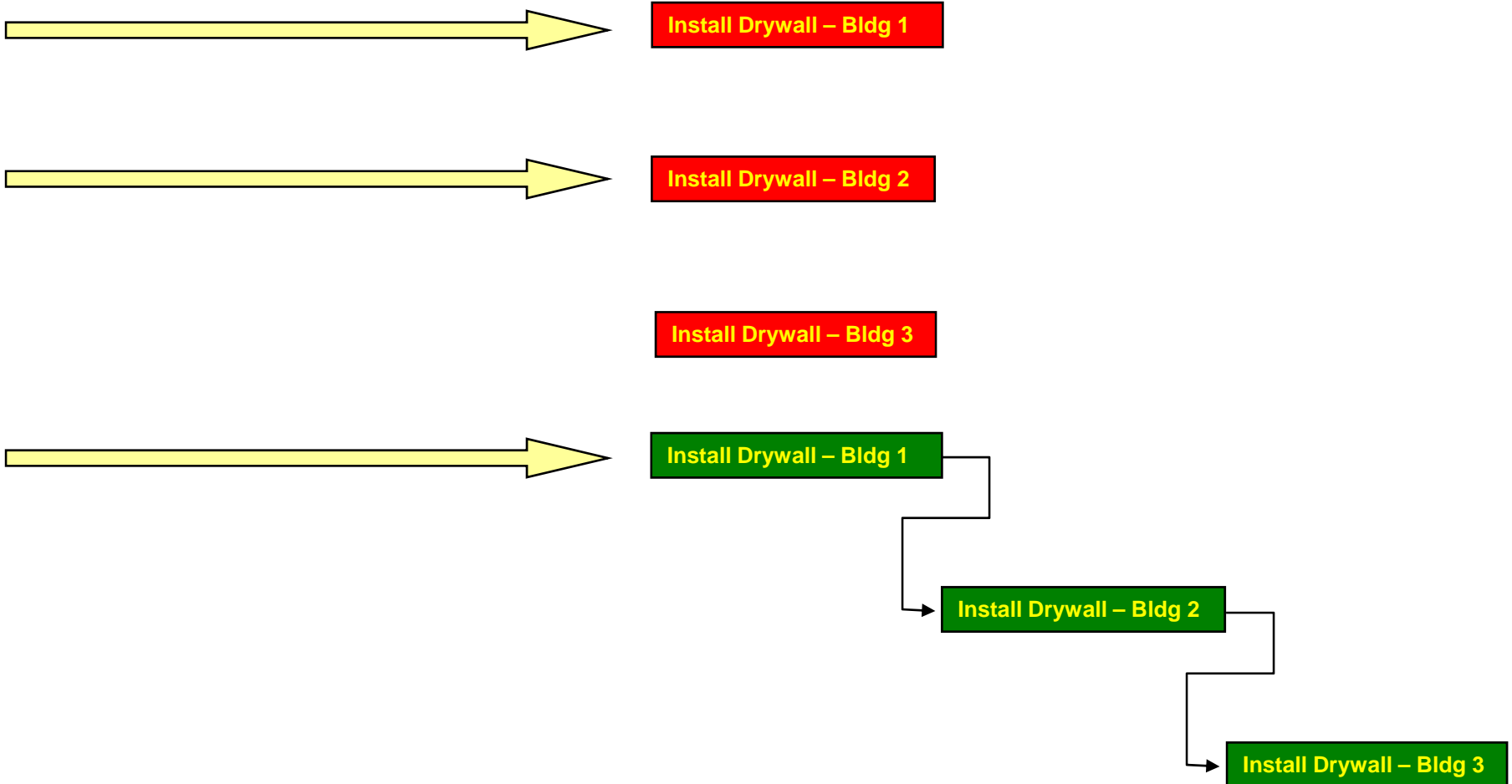
Install Drywall – Bldg 1

Install Drywall – Bldg 2

Install Drywall – Bldg 3

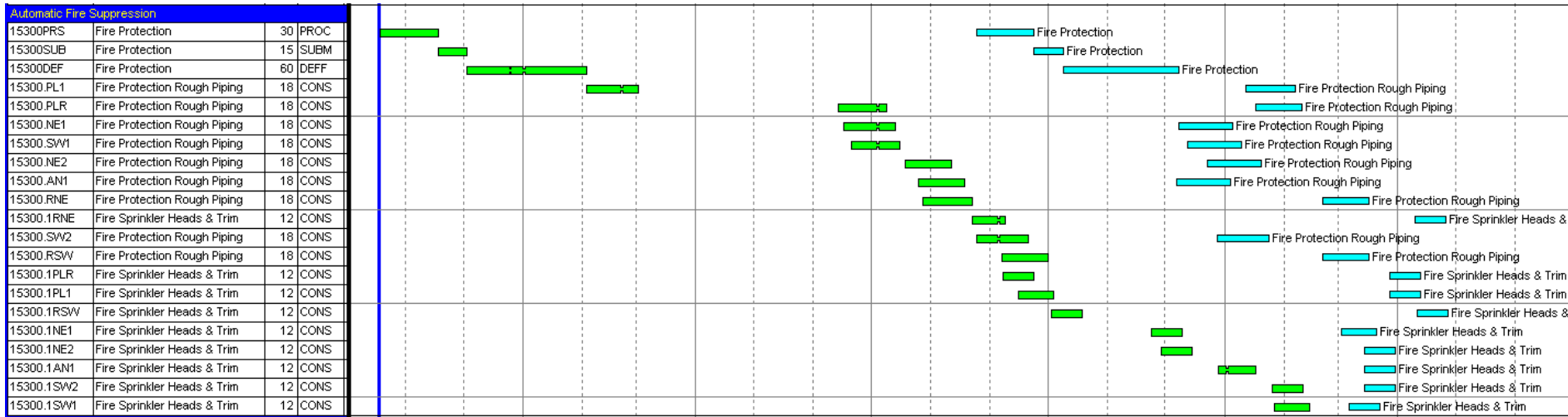


## Resource Constraints – Their Role in the Schedule





# Bar Charts – The Bigger Picture



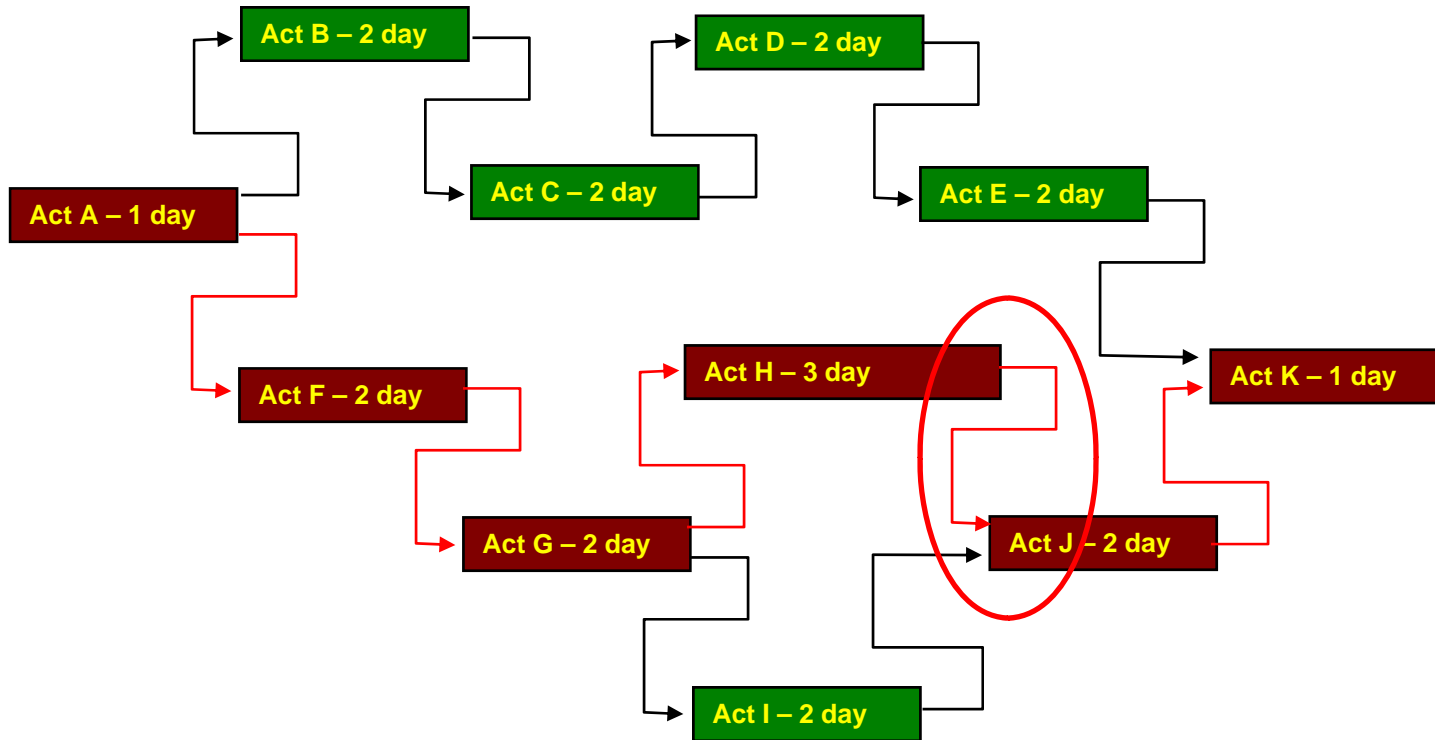
# Schedule Calc. Setting-Retained Logic

- Retained Logic Schedules an Activity With Out of Sequence Progress According to the Network Logic. It Allows an Activity to Begin Out of Sequence, but the Remaining Duration for the Activity Cannot be Completed Until It's Logical Predecessors Complete.

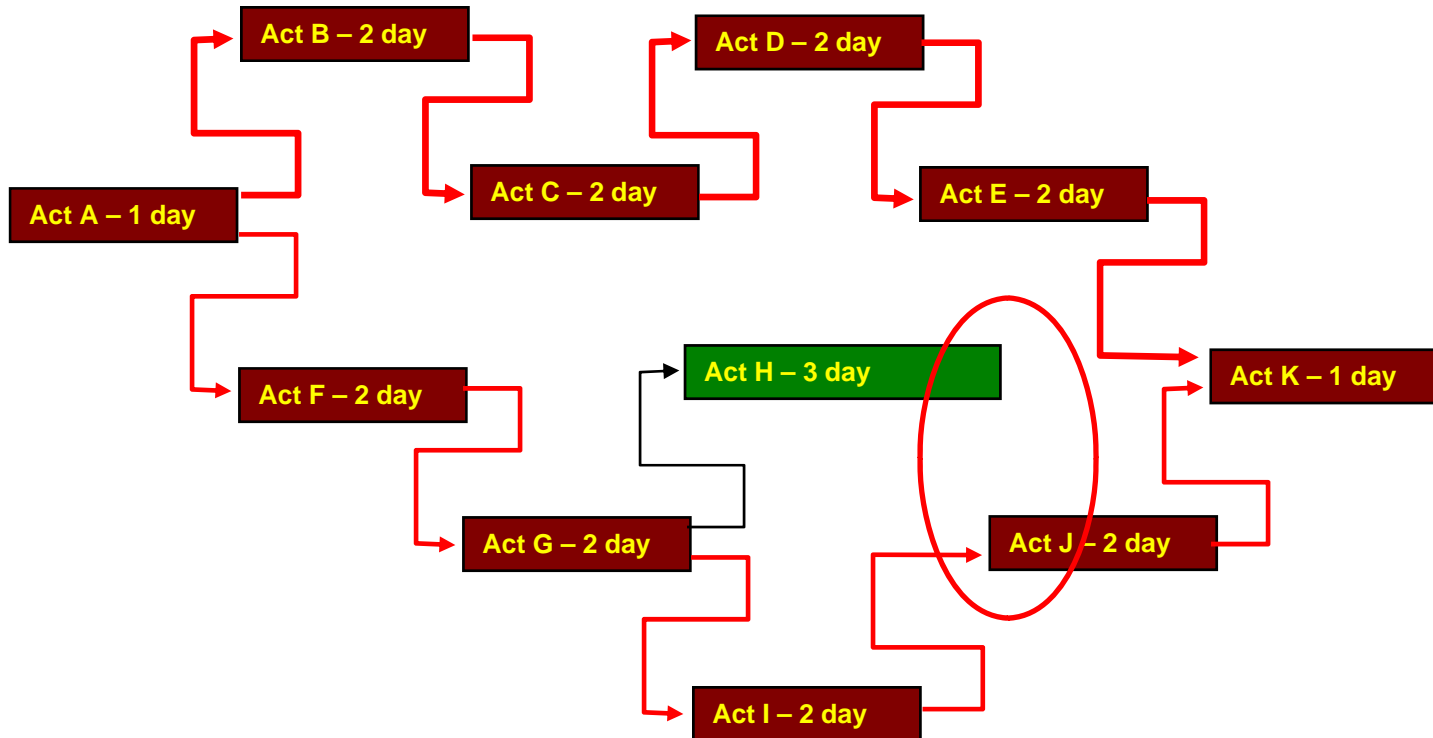
## Schedule Calc. Setting-Progress Override

- Progress Override Ignores Network Logic and Treats Out of Sequence Activities as Though They Have No Predecessors and Can Progress Without Delay.
  - ***Violates CPM Fundamentals.***
  - ***This Can Hide Delays To The Project.***

# Removing a Successor Relationship



# Removing a Successor Relationship



## ***Construction is a Dynamic Process, Change Will Occur!***

- Analyze to Assure Change is Impacting Critical Path
- Determine if Delay is Excusable and Compensable
  - ***Weather Delays are Typically Excusable, But Not Necessarily Compensable***
- Determine if There is Concurrent Delay
- Resolve Delays Promptly and Fairly
- Enforce Time Impact Analysis Requirements
  - ***GC's 4.16 Does Not Require TIA***
  - ***Supplementary 4.16 Requires TIA***

# Time Impact Analysis (TIA's)

- ***Simple to Develop Regardless of What Contractor Says***
- Fragmentary Network (Fragnet) Incorporated Into Recent Monthly Schedule Update
  - Fragnet Depicts Scope of Change or Alleged Delay.
  - Once Added Recalculate Schedule to Determine Actual Impact.
  - Then Determine Workaround Options



# Work Around Options

- Increase Manpower
- Increase Work Hours and Workdays
- Add Addition Shifts
- Re-sequence Work Activities
  - ***Meeting Of Minds Required Here***
- Increase Equipment Or Material

# What They Don't Teach in Construction Management 101 “Dealing With Change”

- Thank you for your time
- Questions?

**This concludes The American Institute of Architects  
Continuing Education Systems Program**



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