Construction Business Practices

DanSteurer@gmail.com

Objectives

- How to estimate labor, material, and cost to form a bid
- Contract Management
- Project Management
- Scheduling
- Supervision

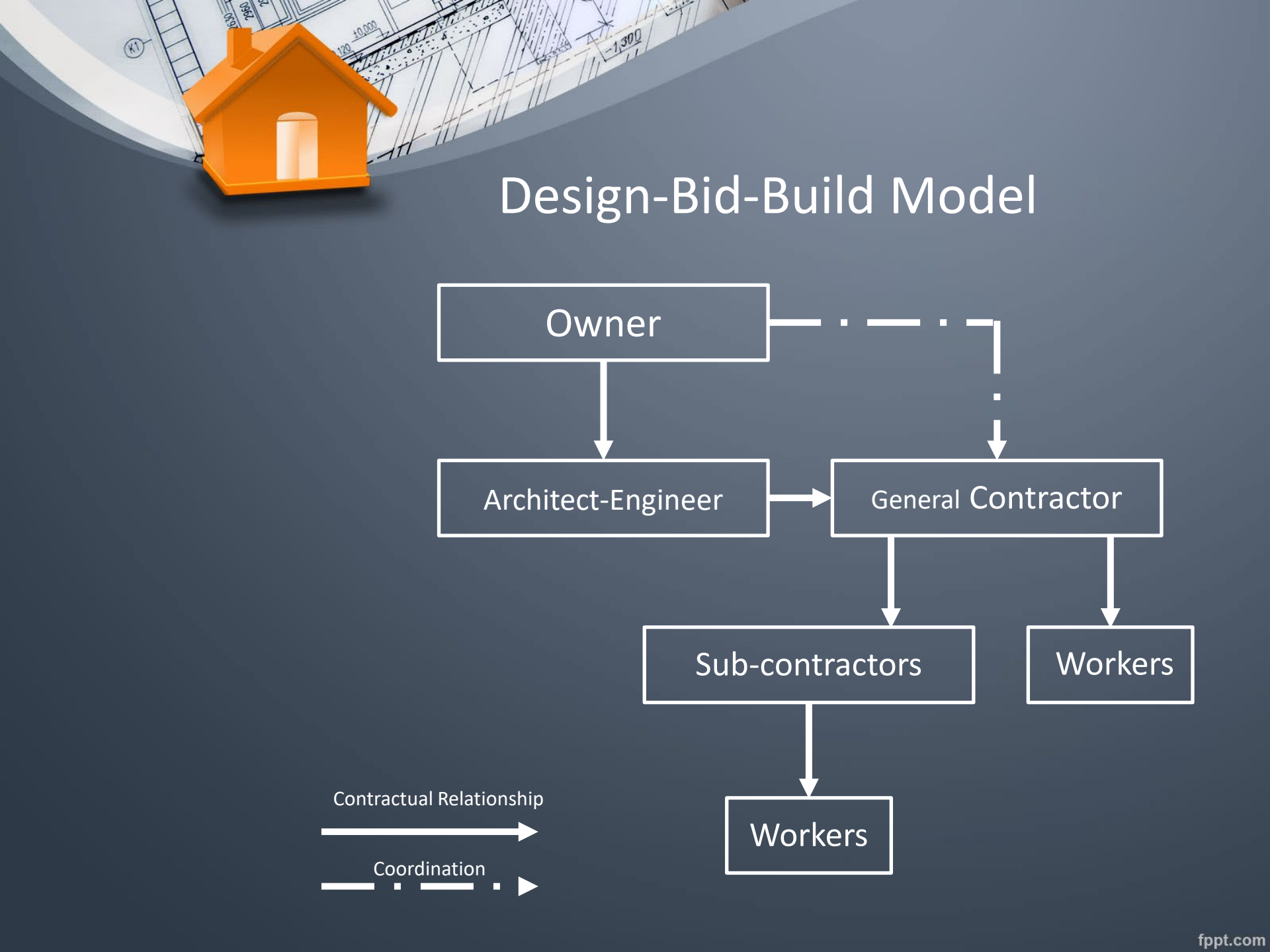
Estimating and Bidding

- Includes more than just a cost estimate
- Considerations:
  - Scope of Work
  - Capabilities
  - Projection of costs
  - Location
  - Schedule
- Labor Very Important

Construction Documents

- Types of projects
  1. Design-Bid-Build Process
  2. Design-Build Process
  3. The invitation to Bid Documents

Design-Bid-Build Model



Design-Bid-Build

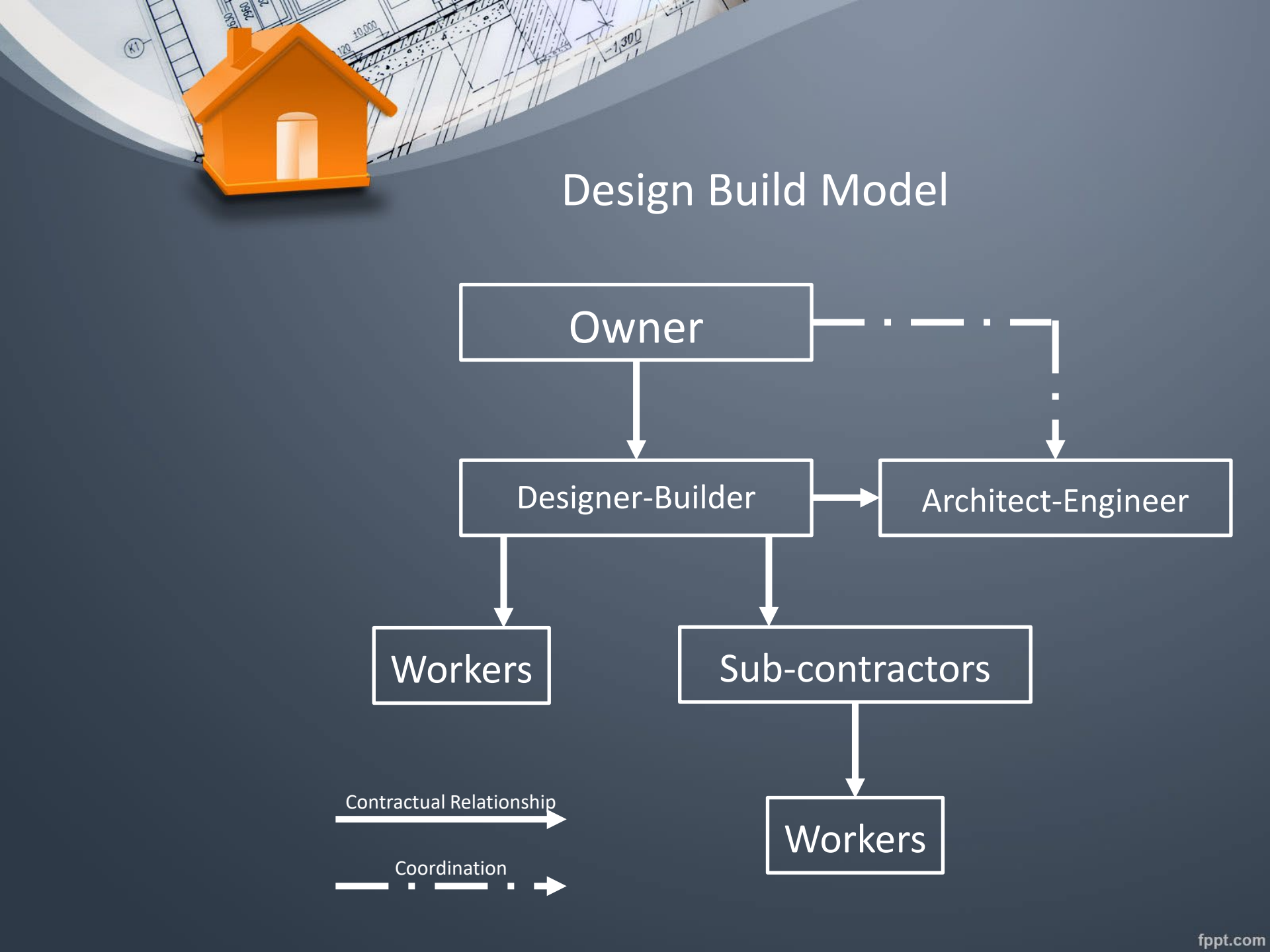
Advantages

- Owner controls design and construction
- Design changes are taken care of easily prior to construction
- Design is complete prior to contract award
- Construction costs are fixed at contract award
- Low bid cost, max competition
- Ease of implementation
- Owner controls quality

Disadvantages

- Requires owner expertise and resources
- Shared responsibility for project delivery
- Owner at risk for design errors
- Design and construction are sequential – longer schedules
- Construction costs are unknown until contract award
- No contractor input in design or planning phases

Design Build Model



Design-Build

Advantages

- Single entity responsible for the design and construction
- Construction starts before design completion – reduced schedule
- Construction costs known and fixed during design
- Design and construction risk is transferred from owner to Design-Builder
- Emphasis is on cost control
- Requires less owner expertise and resources

Disadvantages

- Minimal owner control of both design and construction quality
- Requires comprehensive performance specification
- Design changes after construction begins are costly
- Potential conflict of interest with designer and contractor
- No one represent owner’s interests
- Regulations

Invitation to Bid

- Brief overview of the project
- Bid Instruction – Specifics on how to submit bid
- Bid Sheet – Form used to submit the formal bid
- Bid Schedule – Bid date, mandatory meetings, etc.
- Information Sheet/Questionnaire – Experience and financial capability
- Contract Copy
- Supplemental Information – Property survey, soil analysis, etc.
- GSA catalog listing – Gov't and Institutional

Estimating

- Clear understanding of the Scope of Work will help to ensure accurate estimate
- Don’t assume anything -- RFI
- A good estimate should be within 1-3% of the actual project costs
- Job costing and previous bids

Location

- Access to the site (winter access)
- Weather restrictions
- Soil type
- Grading
- Availability of utilities (electricity, water, etc.)
- What others?

Capabilities

- Not all contractors have the capacity to perform all work.
- License classification scope
- Competencies, Abilities, or Education
- See definitions in Statute

Scope of Work

- What is involved in the project
- Scope can affect pricing and lead times
- All questions should be answered prior to bid submission: RFI
- See some examples

Cost Rough Estimate

- Sometimes owners simply don’t know
- Assess owners budget expectations
- Should have a rough estimate before an actual bid
- Beware of Cost per Sq. Ft.

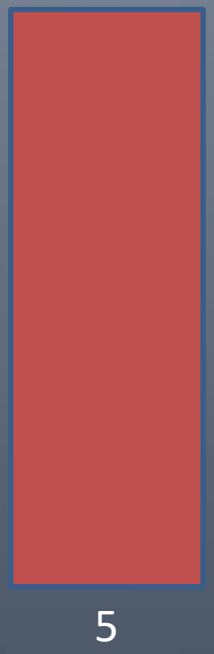
Other Methods

- Concept Estimate – Developed by the architect, generally does not include unique characteristics of the project or all costs

- Square-Foot Method – Quick, but does not consider project design variances, volume, etc.

Cost per Sq Ft

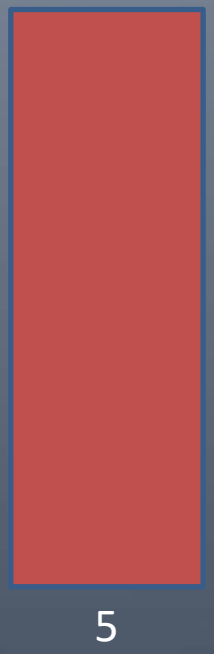
How many Sq ft ?



Cost per Sq Ft

Same Construction Cost?

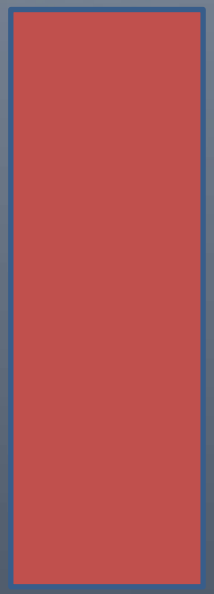
100sf



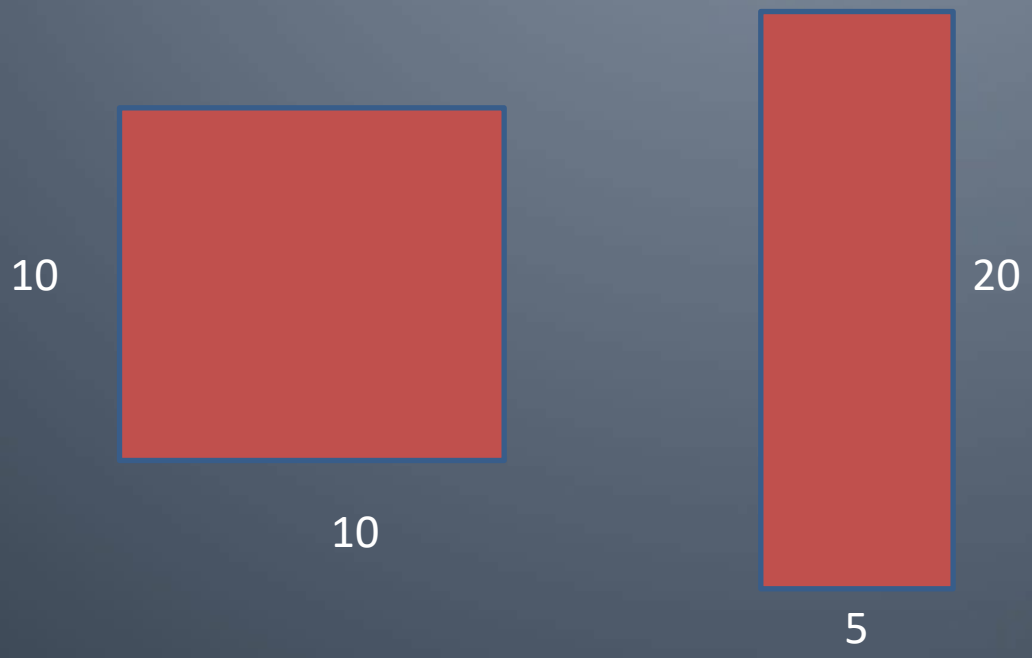
100sf

Cost per Sq Ft

How Many Linear Feet?



Cost per Sq Ft



40 LF vs. 50 LF = 20% difference

20% more footings, lumber, insulation, drywall, stucco, paint, trim, etc. = more cost for rectangle

The “Box” = low cost design

21-221453 Residential Pending **$439,000**

List Price/SqFt:	243.08
Cross Street:	Ruby Place
Tax ID:	W-PRYL-640
Tax Year:	2021
Occupant Name:	
Intermediate Schools:	Fossil Ridge Intermediate
Main SqFt:	1,806
Total SqFt:	1,806

REALTOR MLS LISTINGS

Price/sf vs Cost/sf

21-220648 Residential Active **$1,499,000**

List Price/SqFt:	478.76

Cross Street:	
Tax ID:	I-SHO-18-478
Tax Year:	2021
Occupant Name:	Cheryl Smith
Intermediate Schools:	Lava Ridge Intermediate

Main SqFt:	2,384
Total SqFt:	3,131
Den/Office:	Yes
Year Built:	1997

REALTOR MLS LISTING

Price/sf vs Cost/sf

3 BEDROOMS | 3½ BATHROOMS | 3-CAR GARAGE | 2,976 TOTAL LIVING AREA | PRICE $1,100,000 | HOME IS NOT FOR

Tierra Moderna is located in the new Johnson Arch subdivision within the beautiful Ledges of St. George master-planned community. The unique desert modern c features an open floor plan with a large great room boasting 12-foot ceilings and opening to a rear patio showcasing a custom pool and integrated spa. The home includes a large 3-car garage with one 45-foot-deep tandem RV/boat garage space.

370

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2021
PARADE

$370/sf
Price

Cost per Sq Ft - Guidelines

- Better to compare total ”Under Roof” footage
- Custom vs. production cost differences
- Compare similar plans, volume, grade, garage size, etc.
- Compare sub–bids divided by sq. ft.
- Replacement Value opportunities

Bidding Strategies

- Quality level of finish and specifications
- Allowances
- Owner expectations
- Compensation methods for GC
- Risk Management: Cost-plus vs Fixed Price

Managing Risks

- Risk of material cost variances
- Shortages, delays
- Fixed vs floating contracts
- Time or performance Penalties
- Insurance, bonding
- Compensation strategies
- Depreciation of equipment, etc = hidden cost
- Inflation

Monetary Risk

- What is money?
- Present Value, Future Value
- Google “CPI Calculator” - find purchasing power of $1,000 in 1973 vs today 2021?
- Impact of Inflation on profit, ROI, savings and investments.

Consumer Price Index - CPI

CPI Calculator : 2020 to 2023 = 19.4%

$1.oo in 2020 now worth $.80

Historical Currency in USA

Ended in 1933 : No longer could exchange US currency for Gold

Ended in 1964 : Commodity backed -- minted silver coins devalued with copper. Pre-1964 coins now worth 22x's

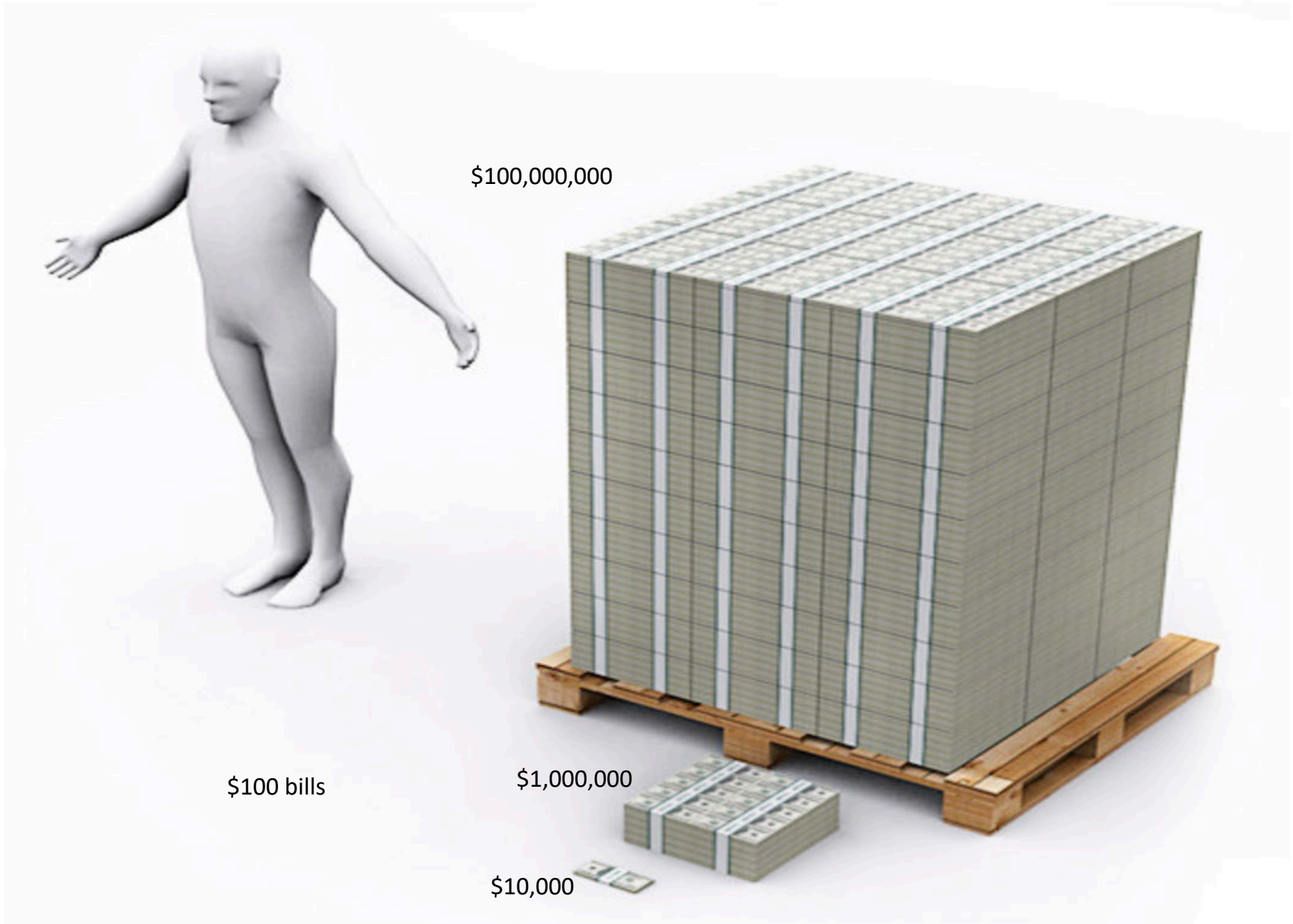
Ended in 1971 : Silver Certificates – can no longer be exchanged for actual Silver

Since 1971: FIAT currency – printed paper with no commodity backing. Value is based on public confidence in the government

Inflation in FIAT Currency Economy

- Printing huge quantities of money causes devaluation of currency and rising costs.
- Commodity supply distortions causes shortages and price fluctuations
- Interest rate manipulation by Federal Reserve affects cost of capital
- Covid “bail out” money created extra money in hands of consumers and businesses.

One Hundred MIllion Dollars:



One Billion Dollars:

10 x $100,000,000

One Trillion Dollars:

$22 Trillion (80% of all US currency) printed since 2020

Interest on current US debt

Time as a Commodity

- 100,000 Seconds = 28 hours
- 1 Million Seconds = 11 days
- 1 Billion Seconds = 32 years
- 1 Trillion Seconds = 31,710 years

Estimating Types of Costs

- Supervision
- Testing, Engineering, Outside
- Fixed and variable overhead
- Building Permits
- Development Fees
- Job site office and back office support
- Subcontractor/Supplier costs
- Loan and Financing expenses
- Bonding and Insurance
- Taxes
- Waste
- Hidden costs: Depreciation, Inflation,

Estimating

- Includes ALL expenses associated with the project
- All costs PLUS overhead and profit margin
- Include soft and hidden costs
- Easier to manage if the work can be broken down into smaller task categories
- Accounting system integration

Accounting Systems Integration

Divisions

- Division 01 – General Requirements
- Division 02 — Existing Conditions
- Division 03 — Concrete
- Division 04 — Masonry
- Division 05 — Metals
- Division 06 — Wood, Plastics, and Composites
- Division 07 — Thermal and Moisture Protection
- Division 08 — Openings
- Division 09 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Equipment
- Division 15 — RESERVED FOR FUTURE EXPANSION
- Division 16 — RESERVED FOR FUTURE EXPANSION
- Division 20 — RESERVED FOR FUTURE EXPANSION
- Division 21 — Fire Suppression
- Division 22 — Plumbing
- Division 23 — Heating Ventilating and Air Conditioning
- Division 24 — RESERVED FOR FUTURE EXPANSION
- Division 25 — Integrated Automation
- Division 26 — Electrical
- Division 27 — Communications
- Division 28 — Electronic Safety and Security
- Division 29 — RESERVED FOR FUTURE EXPANSION
- Division 30 — RESERVED FOR FUTURE EXPANSION
- Division 31 — Earthwork
- Division 32 — Exterior Improvements
- Division 33 — Utilities
- Division 34 — Transportation
- Division 35 — Waterways and Marine Construction
- Division 36 — RESERVED FOR FUTURE EXPANSION
- Division 37 — RESERVED FOR FUTURE EXPANSION
- Division 38 — RESERVED FOR FUTURE EXPANSION
- Division 39 — RESERVED FOR FUTURE EXPANSION
- Division 40 — Process Integration
- Division 41 — Material Processing and Handling Equipment
- Division 42 — Process Heating, Cooling, and Drying Equipment
- Division 43 — Process Gas and Liquid Handling, Purification and Storage Equipment
- Division 44 — Pollution Control Equipment
- Division 45 — Industry-Specific Manufacturing Equipment
- Division 46 — Water and Wastewater Equipment
- Division 47 — RESERVED FOR FUTURE EXPANSION
- Division 48 — Electrical Power Generation
- Division 49 — RESERVED FOR FUTURE EXPANSION

Learn How to Manage Your Financial Data

If you're not a CPA or don't enjoy number crunching, handling business accounting and financial management probably isn't your favorite task as a business owner. But fear not! With ***Accounting and Financial Management for Residential Construction***, you can sidestep the dread and establish a system that effortlessly keeps your finances on track.

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Schedule

- Schedule should be considered prior to submitting the bid
  - Schedule of current jobs
  - Expected completion schedule of the project
- Available additional workforce
- Overtime expense
- Allocation of overhead and fixed costs over time
- What does it cost you per day to be in business?

Use of Technology

- Advantages: Many programs. Quicker estimates, Databases for unit cost items, Multiple report formats, Historical information, Job Costing

- Disadvantages: Project anomalies, Specific project costs, Human error, Technology failure

Estimating Summary

6-Step Format

1. Take Off – List of all materials for the project, RFI for any vague or unknowns

2. Materials and Equipment List – Used to get bids from suppliers and determine rent, lease, buy options

3. Waste Factor – probably more than you think; company history can be helpful

Estimating Summary

6-Step Format

4. Labor – Perhaps most difficult variable to estimate
   - Burden – Unemployment Insurance, worker's compensation insurance, state and federal withholdings

5. Overhead – Tool & Vehicle maintenance and replacement, Office, Accounting personnel, Administrative support (Usually a percent of labor and material estimate), Insurance, Taxes, etc.

6. Mark-up & Profit – Portion retained for owners and reinvestment, Often included with overhead, Should be separate line item

Contracts: Managing Risk

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Contract

- Binding agreements between two or more parties.
- Includes formal summary of the agreement
- Verbal or Written – Both are valid, written is better
- Contact size depends on the complexity of the project

Contract

- Four Elements:
  - Offer and Acceptance
  - Consideration
  - Competent Parties
  - Legal Purpose

Offer and Acceptance

- Offer:
  - Work To do or Not To do
  - Clear and understandable
  - Work to do, payment arrangements, and Time Constraints
- Acceptance:
  - Expressly or Implied
  - Signed Contract is Best

Offer and Acceptance

- Offer and Acceptance Components:
  - Date of the offer
  - Name and contact info of all parties
  - Name/Location of project
  - Description of work to be performed
  - Start and End dates of the project
  - Payment terms – Progress payment schedule, final payment
  - Schedule delays
  - List of Contract document

Consideration

- Exchange of something valuable
- Services for Money or trade
- Clear language to explain the terms and conditions of payment
- Eliminates conflict and blame

Competent Parties

- Both parties must be legally competent to enter into the contract
- Sound mind
- Mentally disabled
- Drugs or Alcohol
- Minors

Legal Purpose

- Assigned work must be possible to perform
- Cannot harm anyone
- Cannot require illegal activity
- Always consult an attorney

Standard Forms

- Complicated and Lengthy
- If drafted correctly, include all necessary information to protect both parties
- Legally tested and proven language
- May need additional information to address project specific concerns
- Available from AIA, trade organizations, construction books, or the internet
- Ensure forms are specific to Utah

Change Orders

- Used whenever a contract needs to be altered
- Should be drafted and signed by both parties
- Should include a detail of the change
- Should include financial and schedule impact

Change Orders

Change Orders

Breach of Contract

- Refusal to perform the contract
- Perform an act prohibited by the contract
- Prevents the other party to perform the contract
- Material Breach
- Immaterial Breach

Material Breach

- Serious violation of the contract, generally ends in the termination of the contract
  - Contractor refuses to perform or complete
  - Owner refuses to pay for completed or partial jobs as per contract
- Usually ends in arbitration or litigation

Material Breach

- Material breach occurs when a contractor does not complete the project in the timeframe specified in the contract.
  - Could result in liquidated damages, generally a “per-date” rate for each day after the contract end date

Immaterial Breach

- Less serious than a material breach but may still have a financial impact to one party

Scheduling

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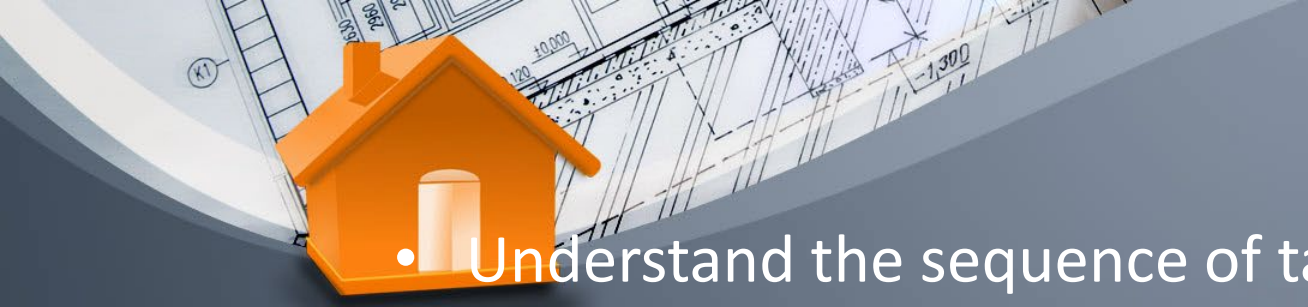
Scheduling

- Perhaps the most important, but most fluctuating aspect of the project
- Schedules are always consistent – consistently changing that is
- A good schedule can have significant impact on the success or failure of the project and the company
- Delays caused by equipment failures, weather, supplier let downs, manpower issues
- Also be ready for a faster than expected schedule
- Having a solid, well-defined schedule can be a great morale booster



Scheduling

- Understand the sequence of tasks - critical to on-time completion
- Understand the scope of work can lead to better scheduling
- Other factors:
  - Size of the project/company
  - Labor hours estimated for the project
  - Length of time dedicated to the project
- Real-time tracking of scheduling can assist in estimating future jobs

Scheduling

- Calendar
- Gantt Chart
- Critical Path Method

Calendar

- Advantages –
  - most basic of all schedule options
  - no computer needed
  - needs calendar, pencil, and time
  - Easy to read and see

- Disadvantages –
  - Difficult to share with stakeholders
  - Changes are difficult to make

Project Name:_____ **Start Date:**_____ **End Date:**_____

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 OFF	2 Activity 1	3	4 Activity 2	5	6 Activity 3	7
8 OFF	9	10 Activity 4	11	12	13 Activity 5	14
15 OFF	16 Activity 6	17 Activity 7	18	19	20	21
22 OFF	23 Activity 8	24	25 Activity 9	26	27	28 OFF
29 OFF	30	31 Activity 10	1	2 Activity 11	3	4
5 OFF	6 Activity 12	7	8 Activity 13	9	10	11 Project Finish

Gantt Chart

- Advantages –
  - Can be done on computer or by hand
  - Computer charts can be updated with little effort
  - Much more graphic than Calendar
  - Can track work completed, progress & percent completed
  - Can be shared electroncally

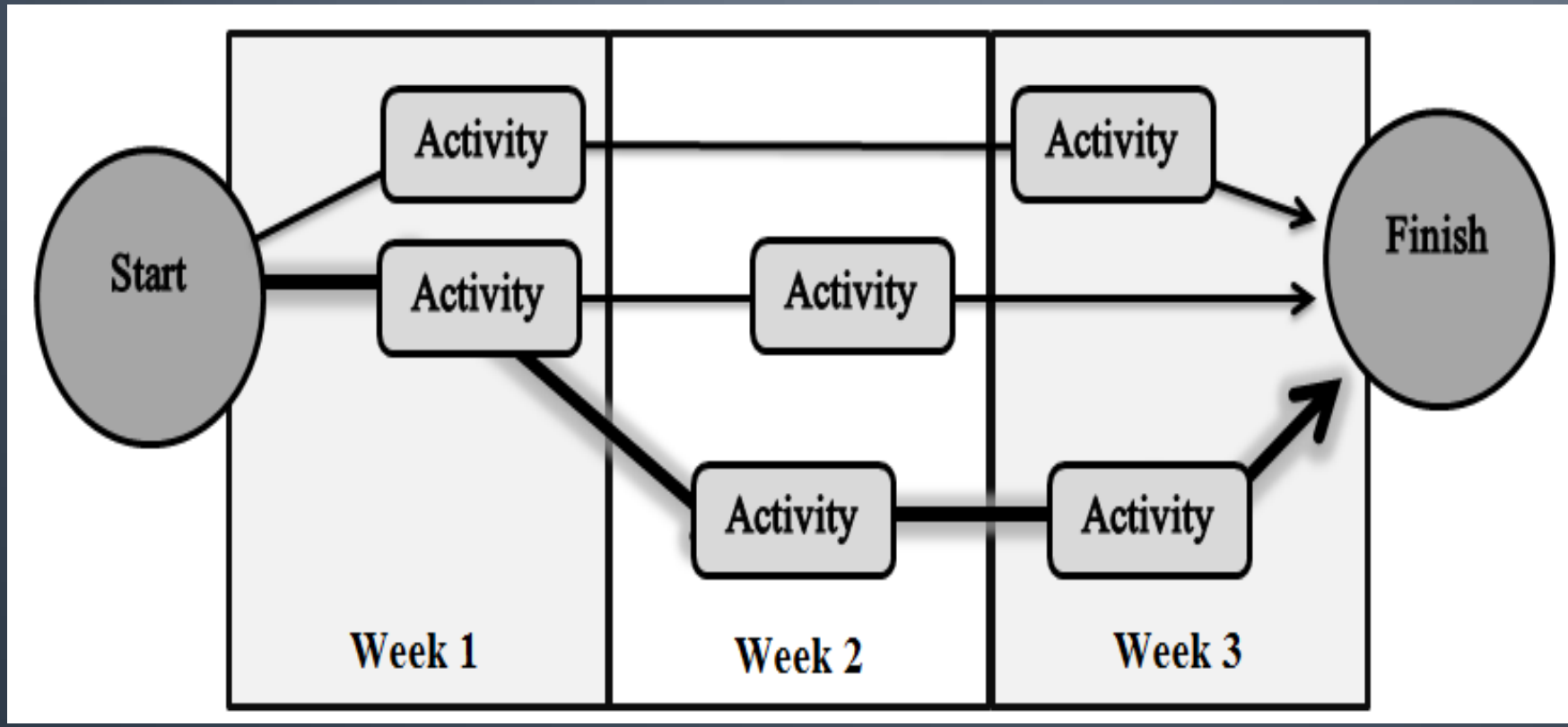
- Disadvantages –
  - By hand requires a lot of work to change
  - Requires a lot of time to maintain

Description of Tasks	July				August				September				October			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Activity 1																
Activity 2																
Activity 3																
Activity 4																
Activity 5																
Activity 6																
Activity 7																
Activity 8																
Activity 9																
Activity 10																

Critical Path Method

- Advantages –
  - Most common, most preferred method
  - Shows Interdependencies of tasks
  - Easy to read schedule
  - Can produce additional reports
  - Can track work completed, progress & percent completed
  - Easily can be shared electronically

- Disadvantages –
  - Requires specialized software


Start
Activity
Activity
Activity
Activity
Activity
Activity
Finish
Week 1
Week 2
Week 3

CPM Definitions

- **Major Activities** – high level overview of the project timeline, key milestones, and critical equipment delivery dates

- **Duration** – The time needed to complete each task; must be figured correctly; experience and history should drive;

CPM Definitions

- **Time Contingencies** – buffer time between task to account for unexpected delays (i.e. weather, delivery hang-ups, etc.)

- **Float Time** – available time in the schedule due to finishing a task earlier than expected. This should not be “figured” into the schedule.

Cash Flow

- Covered in bookkeeping section
- Very impactful on the scheduling
- Timing of draws compared to payroll, sub-contractor payments, other expenses needs to be structured carefully
- Line of credit should be established ahead of time if needed
- Recommended to track each project cash flow separately

Project Management

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Project Management

- Project management is the application of knowledge, skills, and techniques to execute projects effectively and efficiently
- At times, several projects need to be managed at the same time
- Scheduling
- Budgeting
- Quality
- Plans and Specs
- Resource Management (Labor, Materials, Equipment)

Project Management

- Large companies – Generally have several project managers on staff
- Small companies – Owner is generally the project manager
- Project manager is primary point of contact with the owner
- Many responsibilities

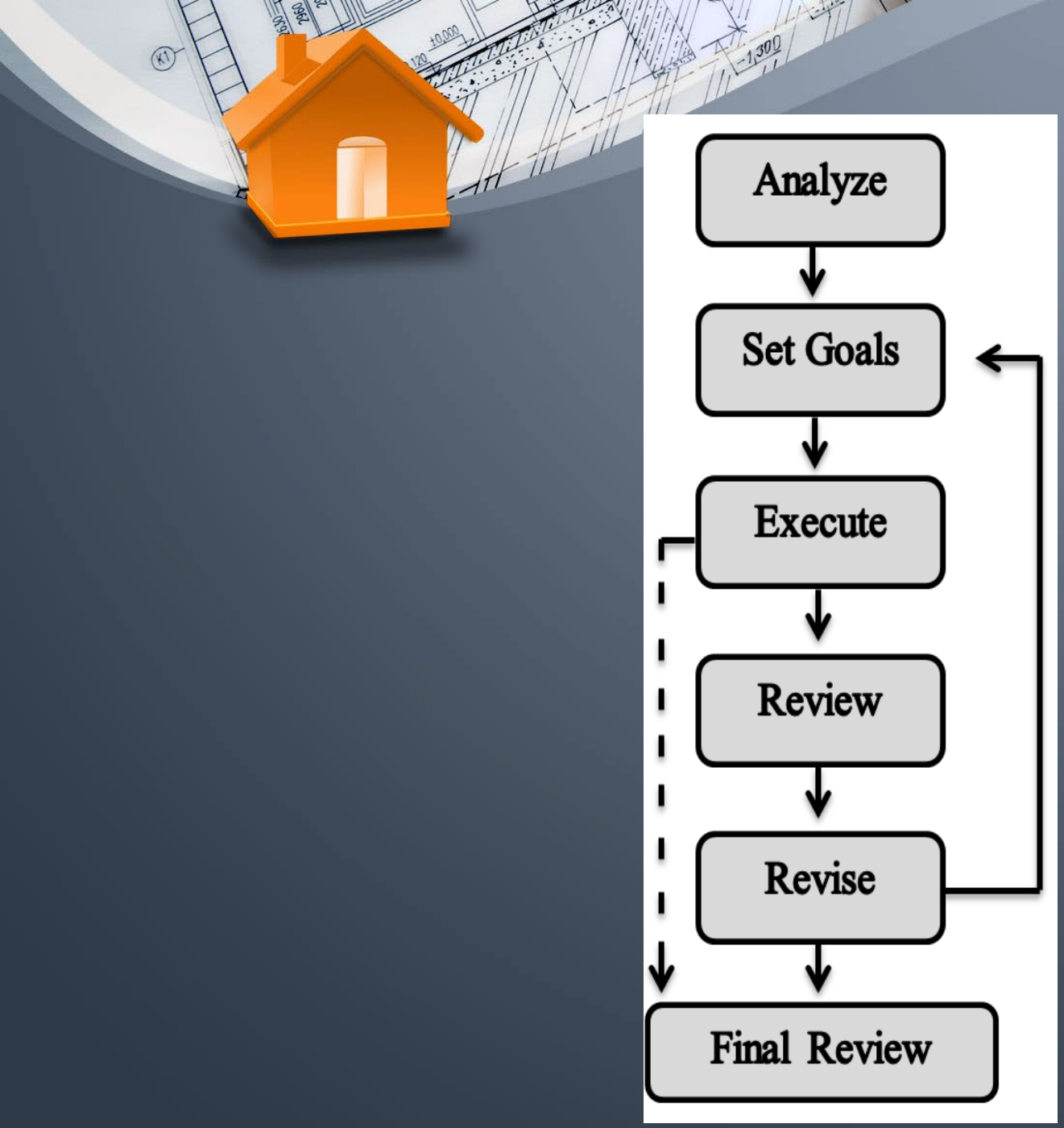
Project Management

- Budgets
- Shop drawings
- Labor requirements and scheduling
- Monitor progress, maintain job records
- Compliance with codes and standards
- Change orders
- Meeting with owners, sub-contractors, architects, etc.

Managing Expectations

- Owners
- Regulators
- Architect/Engineer
- Sub-contractors
- Suppliers
- Tenants
- Lenders
- Insurance

Planning



Analyze

- Full understanding of the expectations
- Consideration of
  - Resources
  - Budget
  - Timeline
- Gather as much information as possible

Goals

- Goals are formed from the analysis phase
- Each project with require different goals
  - Cost driven
  - Time driven
- Cost driven goals usually extend the timeline
- Time driven goals usually require increased costs

Goals

- SMART Goals
  - Specific – Describe the goal as specifically as possible
  - Measureable – If you cannot measure it, how do you know if you accomplished it?
  - Attainable – There is no use setting a goal you cannot reach.
  - Relevant – The goal should align with the needs of the project
  - Time-bound – A goal without a deadline is a dream

Execution

- Systematic process of accomplishing the goal
- This phase is the most time-consuming, uses the most resources, requires the most oversight, and can be the most frustrating or the most rewarding
- Execution phase never goes the way it was originally planned (make sure to have a fall back plan)

Reviewing

- Constant monitoring of progress and all resources
- Material deliveries, Equipment status, manpower, Budget status
- Weather forecasts
- Alignment of project with company goals
- Maintaining daily jobsite log book

Revisions

- Made when necessary
- May include just a slight change in direction
- May require a whole paradigm shift regarding the project
- May drive RFI's or change orders
- Should be discussed with other project stakeholders: owner, architect, sub-contractors, suppliers,
- Should be documented to avoid future complications

Final Review

- Conducted at the conclusion of the project
  - What went right and why?
  - What went wrong and why?
  - What should be different on the next project? Why?
  - What practices should be retained for the next project? Why?

Characteristics of a Successful Project Manager

- Good communication skills
- Honest
- Positive attitude
- Effective delegation skills
- Teambuilding skills

Competencies of a Successful Project Manager

- **Organizational Strategy** – can understand how every job connects to the success of the company
- **Resource Management** – understands the availability and limitations of resources and how to maximize their impact on the project
- **Communication** – must be able to clearly articulate expectations, concerns, and problems with employees, sub-contractors, suppliers, owners, architects, etc.

Competencies of a Successful Project Manager

- **Collaboration** – must be able to work as part of a team with internal and external partners
- **Advocacy** – has the ability to stand up for the needs of the company, must be able to tell the company's story
- **Professionalism** – must be technically proficient and must take the necessary steps to stay proficient in the business

Vital Components to a Successful Project

- Understanding the project as part of the big picture
- Early preparation and planning
- Exceptional management and front-line supervision
- Effective responses to problems and changes
- Amazing customer service
- Good communication skills

Supervision

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Supervision

- Amount of supervision staff is based on size of the company
- Supervisory team can be one person or a team of several people
- Project managers usually manages several projects and must rely on the Superintendent or Foreman to know all details of the job

Superintendent

- On-site, day to day supervisor
- Eyes and ears for the project
- Coordinates with other on-site stakeholders
- Maintains watch on budgets and schedules
- Will be the first to know when project is slipping off schedule
- Maintains daily log book

Foreman

- Focuses attention to a single task or a series of tasks
- Not responsible for project budgets or schedules,
- Inspects work areas
- Assigns personnel and crews
- Completes time cards, accident reports
- Trains employees

Purchasing Agent

- Evaluates suppliers
- Negotiates contracts
- Review product quality
- Can save the company significant amount of money

Safety Personnel

- Safety is an on-going problem in the construction industry

- Safety personnel must be actively engaged in helping to make the worksite a safer place for everyone

Subcontractors

- It is the responsibility of the project manager to supervise the sub-contractors
- This is often delegated to the superintendent
- Sub-contractors play a vital role on the project; the perform most of the work, and generate most of the profit for the project.

Cost Control and Budget

- Projects are bid with certain financial expectations
- It is the responsibility of the project manager to meet or exceed those expectations
- Owner expects a timeline to be met; contractor expects to make a profit
- Starts with a comprehensive budget
- Function of the convergence of scheduling, materials, equipment, and the ability to provide value engineering

Materials

- Materials costs are so volatile
- Project managers should be able to watch the market and anticipate market, and price, fluctuations
- Sub-contractors and suppliers usually only guarantee estimates for a certain period
- Expectations can be met when schedules and material delivery and processing structures are in place

Value Engineering

- Project manager should always be seeking ways to provide an equally quality product (project) at a reduced cost

- Limited by project specifications and agreed upon contract details

Customer Relations

- Understanding owner expectations and working toward those expectations
- Project manager has all critical information necessary to meet these expectations
- Communication, quality assurance, changes, and final inspections

Communications

- The number one ingredient for project success
- Customer expects to be updated regularly regarding project status, challenges, and solutions
- Customers generally do not possess the technical knowledge necessary to understand the nuances of the construction site
- The more explanation a project manger can provide, usually the happier the customer will appear to be

Quality Assurance

- When quality is discussed, reviewed, and reported on a regular basis, customers, as well as the workers, will feel success
- Routine, impactful inspections should be conducted and reported to the owner

Changes

- Changes are hard for everyone, especially the customer
- Processes for change orders should be expressly outlined in the contract documents
- Care should be taken with customers as changes are discuss. Often times when the contractor can explain why the change is recommended and how it will benefit the owner, things go a little smoother

Final Inspections

- Invite the owner to walk through the project for a final inspection
- Make sure all repairs and punch list items are agreed upon by the project manger and the owner

Customer Satisfaction Survey

- Provides the owner a venue to express joy and address difficulties
- Provides the contractor some data to know what actions to continue and what actions need to be addressed
- Customer DELIGHT

Summary

Utah Contractor Pre-education

Summary

- Good Estimates integrate Schedules, Accounting systems, Contracts, and Risk Management
- Good Project Management helps assure that the estimate becomes a successful reality
- Good business systems and reporting improves morale, customer satisfaction and business success
- Develop an exit or transition plan for the business

Construction Business Practices

DanSteurer@gmail.com