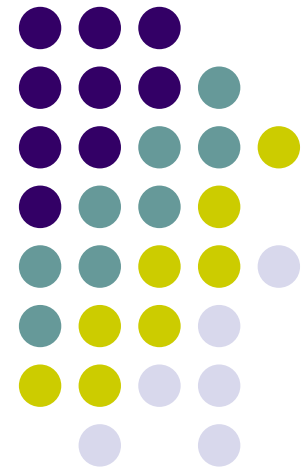


1.040/1.401/ESD.018

Project Management, Spring 2007

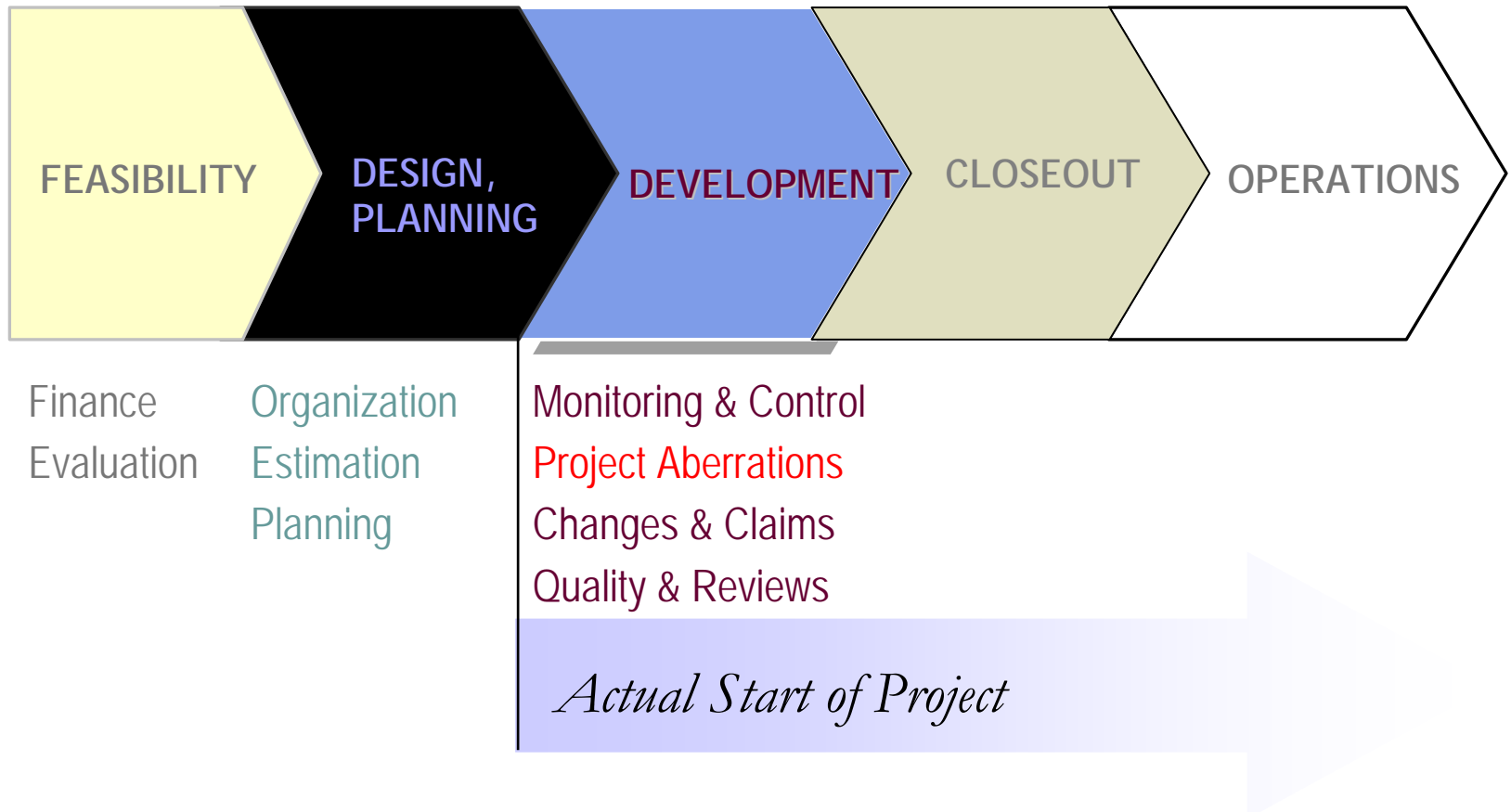
Project Aberrations

Cost Overrun, Change Orders, and Time Delay
Claims and Disputes

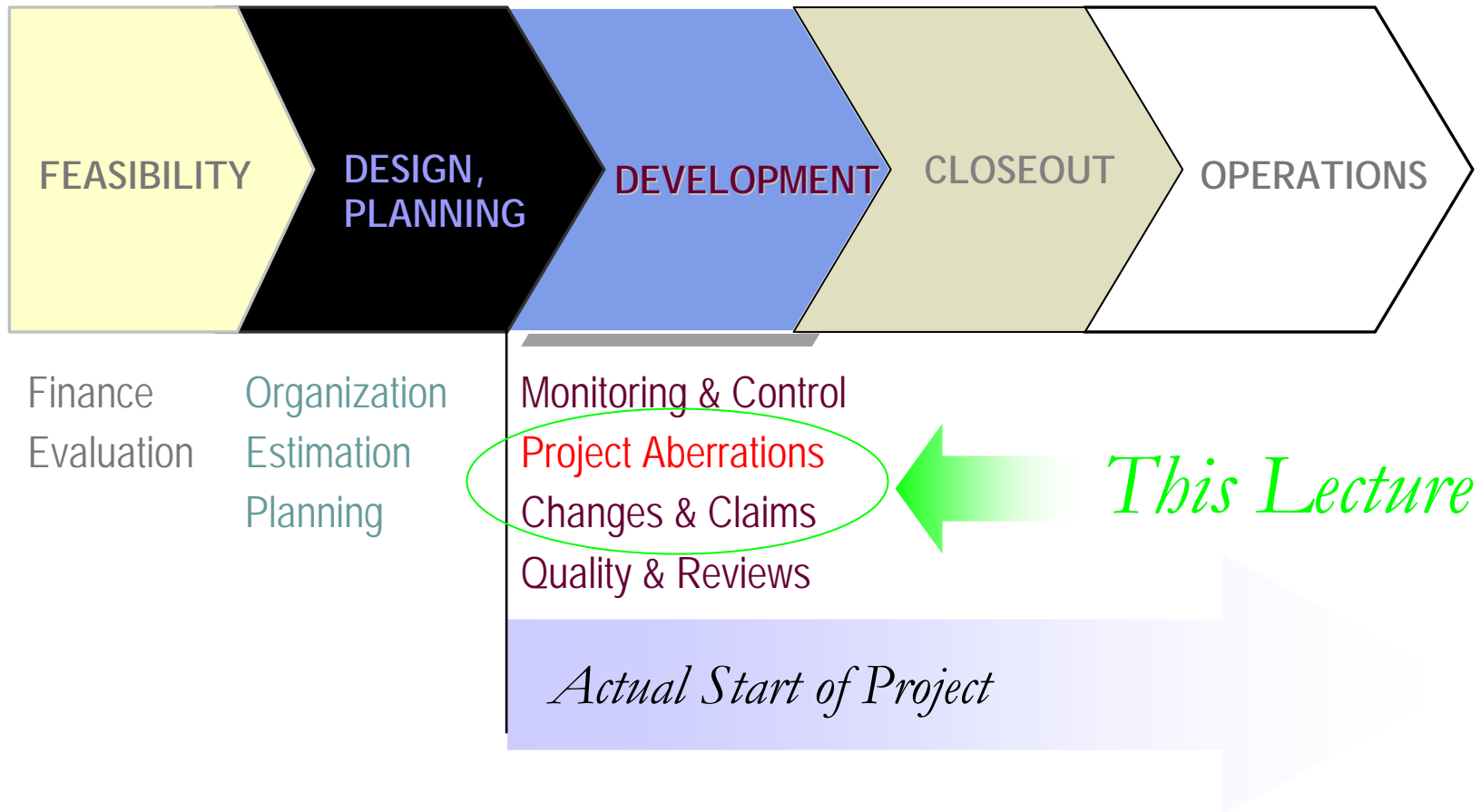


Samuel Labi and Fred Moavenzadeh
Department of Civil and Environmental Engineering
Massachusetts Institute of Technology

Recall: The 5 Phases of Project Management



Recall: The 5 Phases of Project Management





What is a Project Aberration?

“Aberration” the act of departing from the right, normal, or usual course. *(Merriam-Webster)*

- Cost Overruns
 - Time Delay
 - Performance deviations
 - Changes in work scope
- Can lead to
- Change Orders
 - Claims and Disputes



Cost Overruns



Cost Overruns

Original project cost = \$10M

Final cost (at completion) = \$12M

Cost overrun amount = \$2M

Cost overrun rate = $100(2/10) = 20\%$

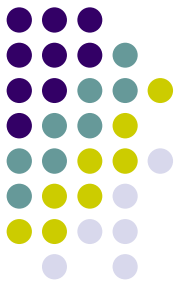
Jahren and Ashe [1990] and Gkritza and Labi [2005] found that cost overruns are caused mostly by:

- project size
- difference between the selected bid and the engineer's estimate
- type of construction
- level of competition
- quality of the contract document
- nature of interpersonal relations on the project

Cost Overruns



- The larger the project, the larger the amount and rate of cost overruns
- Why? The larger a project, the greater the complexity



Change Orders

Change Orders



- A written agreement that reduces, adds or modifies the work from that set in the contract documents
- Standard practice allows the Owner the right to make changes, as follows:
 - Addition or deletion from scope of work (impact time and price)
 - Alteration of methods, materials
 - Changes in contract time or order of work
 - Correct errors
- Contractor can request a change
 - Contractor suggestion to improve quality or work progress
 - Excusable problems

Change Orders



- Changes *contract* scope of work/schedule/cost
- Often start as informal request from Owner, but should always have clear paper trail
 - Often contractor does not wait for formalization
 - Often it is contractor that request changes to recover poor performance (not always allowed!!!)
- Contingency in budget often designed to fund COs
- Unilateral and bilateral

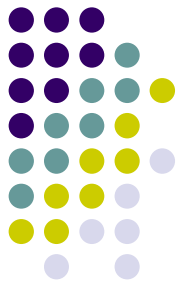
Change Orders- Causes



- **Caused by Owner/AE**
 - Defects/Ambiguities in plans/specs
 - Scope/design changes
 - Delayed access to site
 - Slow submittal approval
- **Caused by Contractors**
 - Late start
 - Inadequate resources
 - Subcontractor/supplier failures
 - Poor workmanship
 - Schedule delay
- **Externally caused**
 - Unforeseen site conditions
 - Regulatory changes
 - Zoning
 - Code
 - Environmental
 - Labor disputes
 - Third party interference

Owner (A/E) Initiated Change Orders:

Directed vs. Constructive



- **DIRECTED CHANGE ORDERS (SCOPE CHANGE)**

- Formal request by owner to perform work differing from that specified in contract (modification/addition/deletion)
- No question that a change occurred. Disagreement can center on financial compensation

- **CONSTRUCTIVE CHANGE ORDERS**

- Change order proposal is evaluated by owner who authorizes modification
 - Must be claimed in writing by the contractor within specified time
 - Claim is that something has implied a “de facto” change in contract requirements
 - Examples: Defective plans & specifications, ambiguous plans, impossibility of performance
- Major source of dispute. Disagreement centers around the interpretations of contract requirements, plans and specs

Change Orders – How they start and how they end

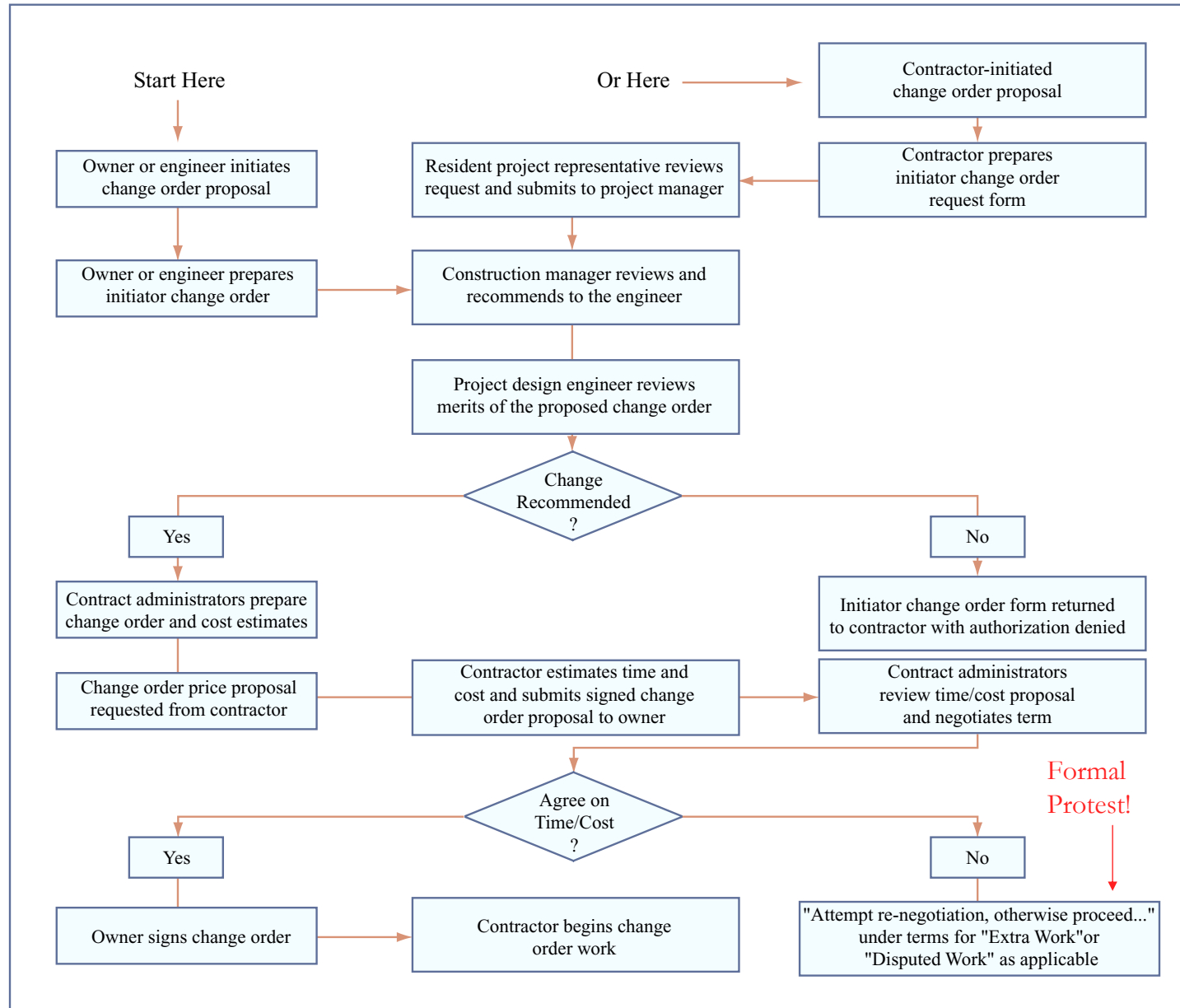


Figure by MIT OCW.

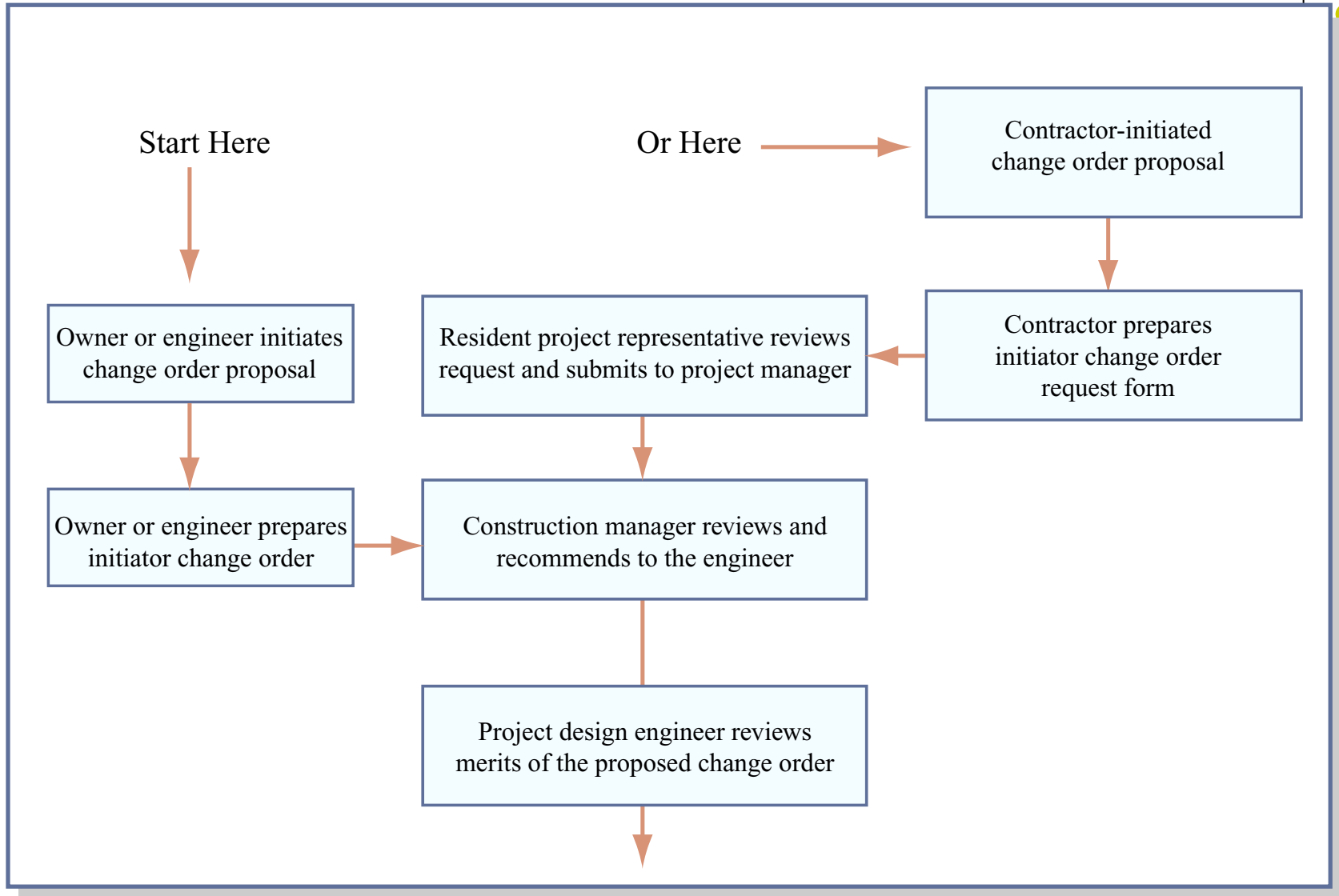
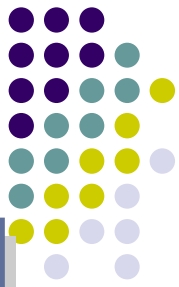
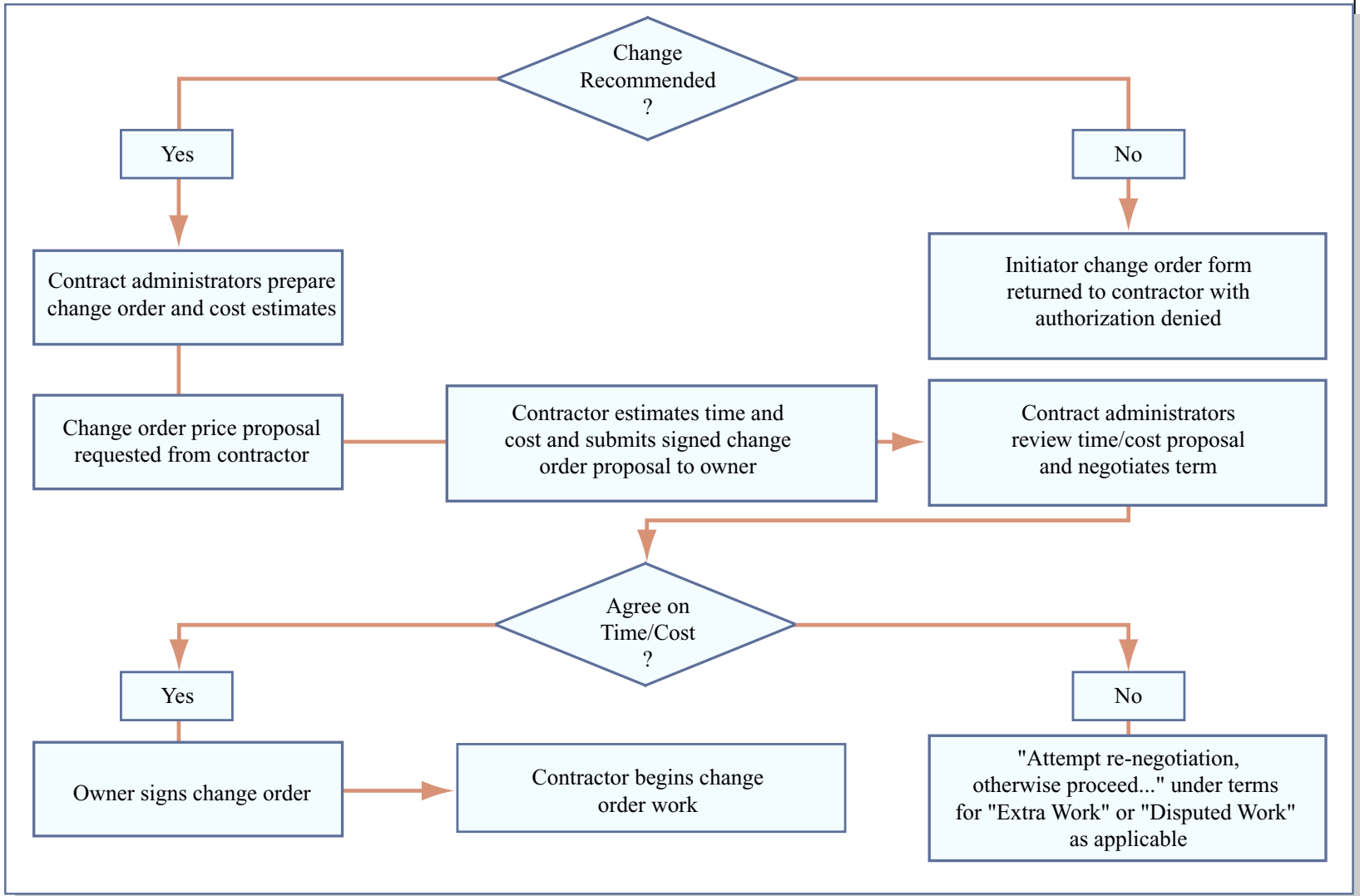


Figure by MIT OCW.



Change Orders – Asymmetries

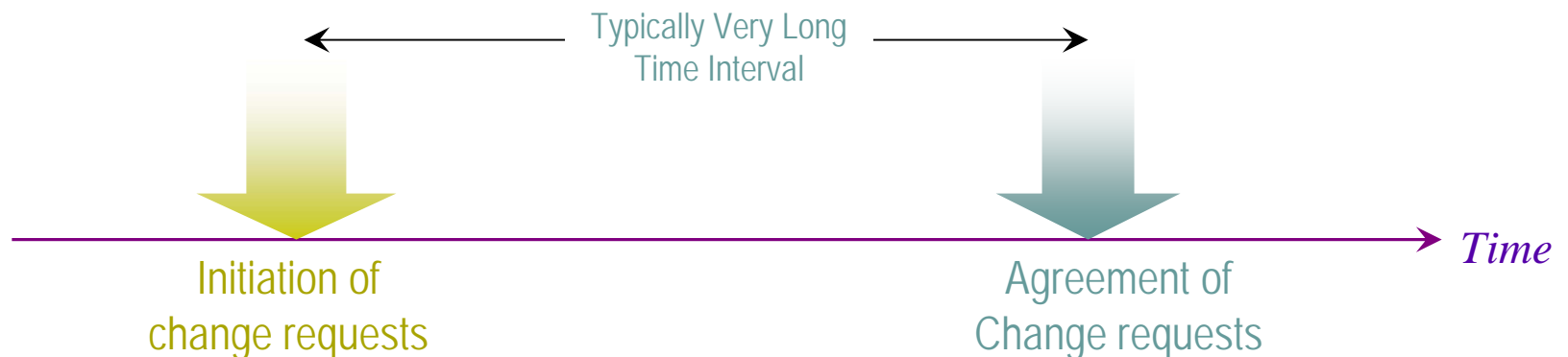


- In many construction contracts, Owner allowed to order contractor to continue work under modified terms even if contractor does not agree to the change order:
 - “Proceed without hesitation”
 - Contractor may “work under protest”
- Contractors in favorable pricing position
 - Owner may appoint “on call” contractor for changes
- For bid projects, owner in favorable contract position
 - “Contract of adhesion” – take it or leave it



Do all Change Requests end as Change Orders?

- Change requests can result in
 - *Change orders*: Bilateral agreement to modify contract terms
 - *Construction change directives*: Unilateral contract modification in the absence of complete agreement
- How long does it take?



Are Change Orders Always Called Just That?



Conflicting Terminology

Type of contract → Parties Involved in CO ↓	Private & Non-Federal Public	Federal
Bilateral	Change Order	“Contract Amendment” “Supplemental Agreement”
Unilateral	“Work Change Directive” “Construction Change Directive”	Change Order



TIME DELAY

Delay



- Time during which some part of the construction project has been extended or not performed due to an unanticipated circumstance.
- Schedule used to estimate implications

Causes:

Differing Site Conditions
Changes in Requirements or Design
Inclement Weather
Unavailability of Labor, material, or equipment
Defective Plans or Specifications
Owner Interference

Caused by:

Contractor
Owner
Designer
Subcontractors
Suppliers
Labor Unions
Utility Companies
Nature

Excusable Delays



- Delay that will serve to justify an extension of the contract performance time. It excuses the party from meeting a contractual deadline.

Causes of Excusable Delays:

Design problems

Employer-Initiated Changes

Unanticipated Weather

Labor Disputes

Fire

Unusual Delay in Deliveries

Unavoidable Casualties

Acts of God (Force majeure)

Nonexcusable Delays



- Delay for which the party assumes the risk of delayed performance and its consequences to its own performance and the impact upon others.

Nonexcusable Delays:

Unavailability of personnel

Subcontractor failures

Improperly installed work

Equipment problems

Foreseeability & Excusability



- Nonexcusable: Late Delivery due to Strike
 - Strike clearly foreseeable and contractor did not plan for it.
- Project Strike
 - Nonexcusable: Unfair labor practice of contractor can be corrected by the contractor
 - Excusable: Unfair labor practice of subcontractor can be beyond the control of the contractor

Impacts of Nonexcusable Delay



- May be considered breach of contract
- May justify the termination of the contract
- Liquidated damages may be assessed
- Normally, extensions are not granted
- Expected to be absorbed into the schedule

Compensable Delay



- Delay that could have been avoided by due care of one party is compensable to the innocent party suffering injury or damage as a result of the delay.
- Both cost and time may be compensable but sometimes only additional cost is Compensable.
- A variety of approaches to estimate indirect cost implications

Critical Delays

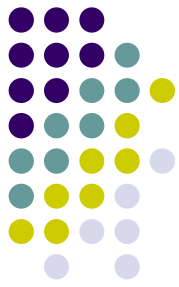


- Extend the Project Completion
- Not necessarily linked to recovery of costs of delay
 - Impact to cost of performance

“Ripple thru” (Snowball) effects of Delay



- Often a delay has many indirect effects that are difficult to clearly quantify
 - Poor coordination (e.g. within site & with subcontractors)
 - Fatigue/morale problems
 - Mistakes due to overwork
 - Lost opportunities for work elsewhere
 - Indirect effects can cause costs, further delays,...
- CPM Diagrams can't quantify these effects – more sophisticated dynamic models are needed



CLAIMS AND DISPUTES

Claims & Disputes



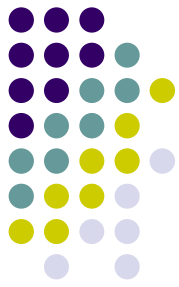
- Can have major impact on all aspects of project performance and quality
- Growing problem
- Need to focus on many components of project
 - Prevention
 - Management (for work to continue during dispute)
 - Resolution
- Has pervasive influence on project
 - Trust/Morale/Speed/Atmosphere

Common Issues about Project Claims



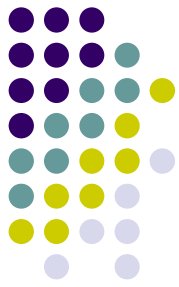
- Owner-caused delays (e.g. slow review of submittals)
- Owner-ordered scheduling changes
- Constructive changes
- Differing site conditions
- Unusual weather conditions
- Orders to accelerate work
- Loss of productivity
- Suspension of work
- Failure to agree on change order pricing

Claims Progression

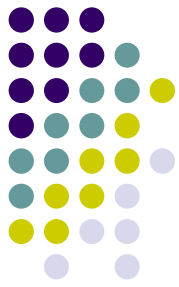


- Claims begin as disagreements between
 - Owner and Contractor
 - (Contractor vs. subs)
- Contractor must notify owner of disagreement
 - Often done through formal letter of “protest”
 - Submitted according to contract conditions
 - Formally responded to by owner or representative
- If cannot work out mutually agreeable course of action, proceed to formal claim

Can Claims be avoided? Minimized?



- Owner should show responsibility
- Project manager should be fair and competent
- Ensure good quality of the design
- Ensure that Contract is well-designed
- Select suppliers/subcontractors with care



Minimizing Claims -- Responsible Owner

- Should clearly conceive the project features up-front
- Single point of responsibility
- Appropriate attention during construction
 - Should promptly and effectively reviews contractor' submittals
- Should make realistic demands about schedules, costs, and product quality
 - E.g., realistic tolerances and specs

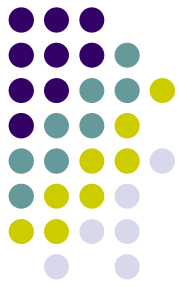


Minimizing Claims -- Competent, Fair PM

- Fair treatment of contractor during work
- Management of communication among parties
- Rapid processing of paperwork
- Good supervision (via superintendents)
- Careful documentation
- Proactive detection of and resolution of disputes
 - Minimization of adversarial inclinations

Minimizing Claims

-- Quality of the Design, Design Follow-ups



- Plans and specifications should be
 - Complete
 - Unambiguous
 - Consistent
- Coordination of owner & CM & A/E responsibilities
- Responsiveness of A/E to submittals
- Regular site monitoring to ensure compliance with the design
- Quality inspections of Shop drawings

Minimizing Claims -- Contract Document Design



- Risk-sharing (*clauses in general conditions*)
 - Float ownership/sharing; subsurface conditions; damages due to delays; quantities; change process; hazardous materials
- Contingencies listed
- Dispute resolution strategy
- Choice of delivery system
 - Length of time to review plans & specifications
 - Degree of input into negotiating/ Designing contract

Minimizing Claims -- Contract Document Design

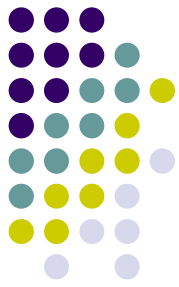


- Selection mechanism
 - If always selecting lowest bidder, can be problem
 - Bidding context particularly key
 - # of bidders/competitors
- Payment mechanism
- Aggressiveness of delivery schedule
- Liquidated damages well-reasoned
- Claims for latent defects

Minimizing Claims -- Additional Suggestions



- Develop internal mechanisms to minimize risk of disputes
 - Drawing a good contract document is most critical
 - Figure out contingencies that may occur
- Develop mechanisms to allow construction to continue while disputes are being resolved
 - Construction change directive
- Avoid delays in communication
- Confirm all oral agreements/changes in writing
- Maintain daily record of work in progress
 - Date
 - Time of arrival of materials
 - Equipment
 - Subs
 - E.g. Unit cost of material



Disputes

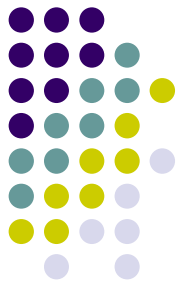
A formal disagreement between the contractor and the owner

Dispute Resolution

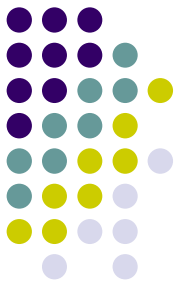
Three general approaches

- Common sense
e.g. notification of owner before claim filed
- Contract-specified terms
e.g. “Construction industry mediation rules”
- Public case law

Specific Mechanisms for Dispute Resolution



- Negotiation
- Stand-in neutral
- Mediation
- Arbitration
 - Dispute Resolution Boards
- Litigation



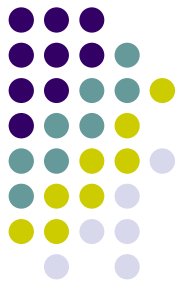
Negotiation

as a mechanism for dispute resolution

- Informal discussion
- No costs
- Efficient
- May be brief

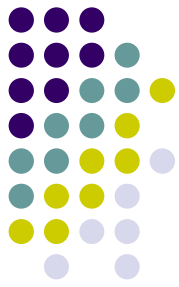
Stand-in Neutral

as a mechanism for dispute resolution



- 3rd party with relevant experience
- Paid by both parties
- Provides expert advice
- Non-binding (parties can still refuse to accept the advice from the third party)

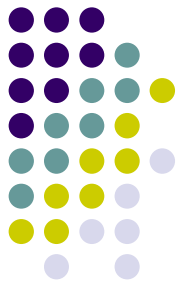
Mediation as a mechanism for dispute resolution



- Officially trained, recognized mediator helps resolve
 - Choice of mediator agreed upon by both parties
- Typically voluntary (non-binding)
 - Parties in dispute must come to agree on wisdom of solution
 - No authority to enforce verdict
- Mediator adopts *active* role
 - Less formal meetings for counseling parties
 - More formal proceedings assist
 - Gathering facts
 - Clarify discrepancies
- Economical
- Typically confidential

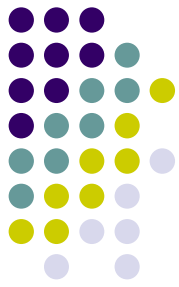
Arbitration

as a mechanism for dispute resolution



- Can be legally binding and enforceable
 - Imposed on parties
 - More “final” than courts – no appeal possible in most cases, no explanation of award required)
- Frequently publicly known
- Typically “passive” – depend on formal presentations by participants
- Advantages vs. litigation
 - Arbitrator is expert in construction area
 - Faster (months vs. years)
- 5 step process
 - Agreement to arbitrate
 - Selection of arbiter
 - Preparation for hearing
 - Hearing
 - Award (within 30 days of close of hearing)

Dispute Resolution Boards



- More common for subsurface work
- 3 members (experienced construction professionals)
 - Owner appointee
 - Contractor appointee
 - A 3rd appointee mutually agreed by both parties
- Meet regularly – already up to speed on project

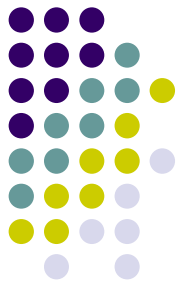
Litigation

as a mechanism for dispute resolution

- Typically a last resort
- Public
- Established case law
- Expensive
- Lengthy (5+ years to reach trial)



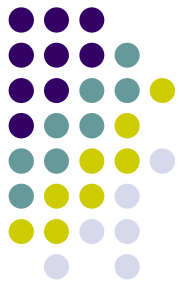
Summary of dispute resolution alternatives



Time	Settlement Cost	Binding Nature	Appeal
Negotiation			
<ol style="list-style-type: none"> 1. Dependent on the parties' negotiators' objectives, attitude, and other factors. 2. Can be very fast. 	<ol style="list-style-type: none"> 1. Minimal. 2. Cost of compromised settlement. 	<ol style="list-style-type: none"> 1. Take it or leave it. 2. May lead to an agreement. 	<ol style="list-style-type: none"> 1. Waived if agreement is reached. 2. Arbitration or litigation if no agreement.
Mediation			
<ol style="list-style-type: none"> 1. Same as negotiation. 2. There may be some limitations imposed by the mediator's schedule. 3. Usually fast. 	<ol style="list-style-type: none"> 1. Mediator's compensation, if any. 	<ol style="list-style-type: none"> 1. Take it or leave it. 2. May lead to an agreement. 3. Moral pressure to reach an agreement. 	<ol style="list-style-type: none"> 1. Waived if agreement is reached.

Figure by MIT OCW.

Summary of dispute resolution alternatives



Time	Settlement Cost	Binding Nature	Appeal
Arbitration			
<ol style="list-style-type: none"> 1. Faster than litigation. 2. Rules may impose some limitations. 3. Availability and schedule of arbitrators is a problem. 4. Preparation may take several months. 	<ol style="list-style-type: none"> 1. Filing fee. 2. Arbitrator's compensation after 2nd day. 3. Attorney fees if any. 	<ol style="list-style-type: none"> 1. May be nonbinding or binding according to contract. 	<ol style="list-style-type: none"> 1. No review of merits in court. 2. Arbitrator not required to explain award.
Litigation			
<ol style="list-style-type: none"> 1. May take up to 5 years or more to reach a trial. 2. Preparation itself may take years. 	<ol style="list-style-type: none"> 1. Prohibitively expensive, both in terms of attorney's fee and time costs. 	<ol style="list-style-type: none"> 1. Binding. 	<ol style="list-style-type: none"> 1. Full appeal.
Drop Claim/Concede			
<ol style="list-style-type: none"> 1. None 	<ol style="list-style-type: none"> 1. Value of claim. 	<ol style="list-style-type: none"> 1. Contractual agreement by mutual accord. 2. Waivers. 	<ol style="list-style-type: none"> 1. None, right waived in most cases.

Figure by MIT OCW.