1.040 Project Management
Spring 2009

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Project Organization II

Spring 2009
Based on Lectures Given by Dr. Nathaniel Osgood in 2005

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Massachusetts Institute of Technology
Project Organization

I. Project Delivery Systems (most common)
   - Design / Build
   - Others
   - Summary

II. Payment Schemes
   - General points
   - Lumpsum
   - Cost plus fixed fee/% price
   - Unit price
   - Guaranteed maximum price

III. Award Methods
   - General points
   - Negotiation
   - Bidding
Part I

- Project Delivery
How To: Design / Build

- Owner
  - Develops early design (to communicate needs)
  - Hires a design/build firm that will complete both design and construction
- This firm can be a design/build firm but also a joint-venture firm for this specific project
- DB company may hire subcontractors
- Work solicited via RFP (honorarium, phased)
- Can be good for complex projects – but need phased design to shield parties from risk
Back to the Future...

- Dominant method early in US history
- Recent drivers
  - Time pressure (desire to fast track)
  - Shortcomings of tightly defined architect role
    - Constructability issues
    - Limited A/E oversight of construction
  - Downsizing of US corporations (outsourcing design)
  - Desire for single source of responsibility
Advantages DB

- Allows Fast Tracking
- May be good for some complex projects
  - Close coordination within team
  - Institutional knowledge build up
- Single source of accountability
- Owner need not mediate or be exposed to designer/contractor conflicts
- Easier incorporation of changes caused by field conditions
Disadvantages DB

- Lack of fiduciary relationship with designer
  - Risk of DB sacrificing design quality to protect profit
  - Owner must assume responsibility for quality assurance
- Pricing not possible at the beginning
- Demands sophisticated owner (construction, quality, oversight of submittals, negotiation, …)
  - Must stay on top of design so don’t get surprise
- Can be bad for many complicated projects
  - Very important for owner to be closely involved to specify important and complex aspects of design
- Package: Can’t pick or get rid of individual team members (e.g. individual subcontractors)
Design-Build Disadvantages II

- Need to make sure design goals stay foremost
  - Often contractor’s interests within DB dominate

- Fewer checks and balances
  - Problems may be hidden until late (no A/E watch)
  - May take direction that owner does not really want
  - Design-build firm can give high quote for changes
    - Responsible for everything!

- If fast tracked, changes can lead to
  - Rework
  - Iteration
  - Delays
Public Use Challenges

- Regulatory hurdles
  - Federal use allowed
    - Federal Acquisition Reform Act of 1996 allowed
  - Many states still do not allow
    - Special permission may be granted for formal request

- Major opposition from
  - Architectural lobby
  - Unions
Bridge Designer/Engineer

- Serves as bridge between
  - Owner
  - Design-build team
- Performs preliminary design before DB team hired
  - E.g. up to 30% design
- Monitors development of design and construction
  - Fiduciary with owner
DB Selection Considerations

- Timing tension for when to recruit DB firm
  - Earlier recruitment:
    - Hard to judge – like beauty contest
  - Later recruit: Less benefit from DB
    - E.g. Lower ability to fast-track
    - Limit creativity (closer to GC)

- Often have segmented pricing (cost-plus design, fixed price or GMP construction)

- More comprehensive selection process typical
  - Design/Price/Schedule/Team
  - Design competitions undertaken
Example Design-Build: I15

- Originally slated as DBB, but made DB to fast-track
  - Hard deadline due to 2002 SLC Olympic Games
- $1.3B joint venture (Kiewit lead company)
- US DOT as owner agency
- Bidded project (with rights to use unsuccessful)
  - Unsuccessful bidders became subcontractors
- Reputation foremost
  - 200 Subcontractors
  - Few reviews
- Finished 5 months ahead of schedule
Modified CM Design/Build: Design Subcontracted

(CM Serves as Design/Builder and Subcontractors Design)

Owner

CM Design/Builder

Sub-Contractor

Sub-Contractor

Sub-Contractor

Sub-Contractor

[Howell et al., 1998]
CM Oversight Design/Build

*(CM Provides Agency Oversight on Owner’s Behalf)*

- **Owner**
- **CM**
- **Design/Build Contractor**
- **Sub-Contractor**
- **Sub-Contractor**
- **Sub-Contractor**
- **Sub-Contractor**

[Howell et al., 1998]
Other Delivery Methods

- **Turnkey (Like DB but Contractor Financed)**
  - Very common in residential housing
  - Gives owner time to raise money during construct.

- **Design-Build-Operate-Transfer (BOT)**
  - Long-term financing (vs. DBO)
  - Can compete on size, transfer time, etc.
  - Have different guarantees needed to entice

- **Multiple Primes**
  - Phase construct., hand-pick team, sophisticated owner

- **Owner/Agent (owner does part of design)**
Type of Relationships Among Participants

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<thead>
<tr>
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<tbody>
<tr>
<td>DBB</td>
<td>K</td>
<td>K</td>
<td>C</td>
<td></td>
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<td>–</td>
</tr>
<tr>
<td>PCM</td>
<td>K</td>
<td>K</td>
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<td>K</td>
<td>C</td>
<td>C</td>
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<tr>
<td>CMR</td>
<td>K</td>
<td>–</td>
<td>–</td>
<td>K</td>
<td>C</td>
<td>K</td>
</tr>
<tr>
<td>D/B</td>
<td>K*</td>
<td>I</td>
<td>–</td>
<td></td>
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</tr>
</tbody>
</table>

K: Contractual Relationship
C: Communication Relationship
I: Internal Relationship
*: Contractual Relationship between the Owner and the D/B Team

Image by MIT OpenCourseWare.
## Advantages of the 3 Most Common Delivery Methods

<table>
<thead>
<tr>
<th>Type of contracts</th>
<th>Traditional Approach</th>
<th>Design Build</th>
<th>Construction Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal and contractual precedent</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost determined before contract commitment</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Fast-tracked construction allowed</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Minimum owner involvement</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cost benefit from competition</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negotiation with quality contractor for unique expertise</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Allow adjustment to new conditions without changing agreement</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Single firm control of design/construct process</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Adapted from Gould and Joyce, 2002
# Disadvantages of the 3 Most Common Delivery Methods

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<th>Design Build</th>
<th>Construction Management</th>
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</thead>
<tbody>
<tr>
<td><strong>Disadvantages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design does not benefit from construction expertise</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design construction time is the longest</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adversarial relationship owner/designer vs contractor</td>
<td>X</td>
<td>~X</td>
<td></td>
</tr>
<tr>
<td>Contract agreement affected by changes</td>
<td>X</td>
<td>~X</td>
<td></td>
</tr>
<tr>
<td>Few checks and balances</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cost control occurs late in project</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Contract amount may be complicated by continual contractor negotiations</td>
<td>X</td>
<td>~X</td>
<td></td>
</tr>
<tr>
<td>Contract agreement affected by unforeseen conditions</td>
<td>X</td>
<td>~X</td>
<td></td>
</tr>
</tbody>
</table>

Modified from Gould and Joyce, 2002
Issues with Bids

- Low bidders can be unreliable
  - Prequalify aggressively!
- To allow for fast-tracking may bid early (30%)
- Don’t try to force delivery from low bid
- Growing Frequency: innovative bidding method
- Pressure for lowest bid can create
  - Cutting corners
  - Low-quality personnel
  - Bad feelings
Part II

- Payment Schedule
Payment Schemes

- **Extremes**

<table>
<thead>
<tr>
<th>Payment method:</th>
<th>Reimbursable</th>
<th>Fixed Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Type:</td>
<td>Service</td>
<td>Commodity</td>
</tr>
<tr>
<td>Award method</td>
<td>Solicit based on Reputation and agree via Negotiation</td>
<td>Bidding</td>
</tr>
</tbody>
</table>
Key Idea Here: Risk Sharing

- Different parties have ability to manage or tolerate different types of risk
  - Owner (or big contractor) often better: Geotechnical risk, weather risk
  - Contractor better: Risk of slow teams, equipment quality, procurement, quality of supervision

- Divide risks within an agreement to
  - Save money on contract price
  - Provide incentive to contractors to finish early, in budget, good quality
Contractors are often highly risk averse

Recall risk premiums: Contractor willing to “pay” owner (charge less for contract) if owner takes on risk – if have to

For risks that contractor can’t control, may be willing to pay a risk premium to owner to take over

Contractor here will lower costs if owner assumes certain risk (essentially, paying the owner a risk premium)

For risks that contractors can control, cheaper for a contractor to manage risk than to pay a risk premium
Fundamental Ideas II

- **Structure contract so that**
  - Risks contractor can better handle are imposed on contractor (i.e. contractor will lose $ if don’t control)
    - To be competitive, will have to manage these
  - Risks owner can better handle are kept by owner

- “Risk can be better handled by A vs. B” here means that the risk premium that would be charged by the A for taking on this risk is smaller than would be charged by B
Impose *high* enough risk incentive to get contractor do job efficiently – within the specifications of the contract

- E.g. Incentive to finish on time, incentive to stay within budget
- E.g. better team assignment, equipment provision, mgmt

Impose *low* enough risk to have reasonably low bid

Impose according to contractor ability to tolerate
Derivative Results of Risks I: Accountability/Monitoring

- Consider parties A and B in an agreement
  - A is contractor; B is owner
- The greater the risk on party A
  - The more incentive on party A to manage this risk
  - The less incentive on party B to manage this risk
  - More incentive on A to monitor the relevant factors
    so B can’t claim the risk is responsible for a problem
  - More incentive on B to make sure that A’s means of risk management falls within the agreement
    - E.g. that not “cutting corners” or otherwise cheating to shield from risk
Derivative Results of Risks II: Impact on Construction Timing

- Both parties must agree on cost to move forward
- In general, more risk on one party, less that party is willing to move forward
- More risk on contractor, the longer will delay construct.
  - Given uncertainty, contractor will charge more up front
  - Owner doesn’t want to pay a huge amount up front
  - As uncertainty is lessened in design, prices converge
- Owner can expedite – by paying higher price (risk premium) to contractor or by shouldering risk
- Remember; delay can have major costs – but so can wrangling over change orders!
Note on Change Orders

- Changes contract (cost/schedule/scope/etc.)
- Can lead to costs beyond contract specification
- Anticipated costs incorporated in “contingency”
  - Often 1-3% on top of agreed upon price
- Often only paid for additional direct costs
  - Big problem if disruption in work
- Source of very large risk
Contractual Risk Allocation

RISK SHARING METER
Modified from Kerzner, 2000

- Lump-Sum (Fixed Price)
- Fixed-Price w/ Economic Price Adjustments
- Fixed-Price Incentive
- Cost-Plus Incentive
- Cost-Plus Award Fee
- Cost-Plus Fixed Fee
- Cost-Sharing
- Cost-Plus Percentage
Cost Versus Price for Lump Sum

(Price is fixed at $10,300)

Final Price

$10,300
$10,000
$9,500

Final Cost

$10,500

$10,000

$9,500

a = If final cost is $9,500, contractor profit is $800 (8.42%)

b = If final cost is $10,000, (as expected), contractor profit is $300 (3%)

c = If final cost is $10,000, contractor loss is $200 (-1.9%)

Image by MIT OpenCourseWare.

Macomber, 1989
Lump Sum ("Fixed Price")

- Contractor required to achieve the project at the negotiated contract value
- All risk of cost, schedule fall on contractor
- The owner knows the actual cost of the project before it begins
- Minimizes risk for the owner if the project is well estimated, contractual documents accurate and project clearly defined
- High incentive for contractor to finish
  - Early (so can move on to other jobs)
  - Low cost (so can make a profit)
Lump Sum

- Required for many public projects
- Good for some well-defined projects
  - Good price competition in commodity metric
- Bad for ill-defined projects
  - Adversarial relationship over responsibility and payment for changes
- High contractor risk means typically start late
- *Very different from typical meaning of “Fixed fee”!*
Ways to Save Money: Effect on Owners

- Helps: Efficiency within construction
  - Best teams
  - Appropriate equipment
  - Careful management
  - Quality workmanship (to avoid risk of rework)

- Hurts: Cutting corners, distortion, charge orders
  - Substitution of materials
  - Distortion of quantities used
  - Distortion of progress
Cost Versus Price for Cost Plus

(Price = cost plus 5%)

a = If final cost is $9,500, contractor profit is $475 (5%)
b = If final cost is $10,000, contractor profit is $500 (5%)
c = If final cost is $10,500, contractor loss is $525 (5%)

Macomber, 1989
Cost Plus Fixed %

- Owner is paying the actual cost plus a fixed percentage
- Contractor agrees to do his best efforts to achieve the work
- Contractor shoulders very little risk
- Typically select contractors based on reputation and comfort (*service* rather than *commodity*)
Cost Plus + Fixed %: Advantages

- Maximum flexibility to the Owner
  - No fighting over change orders – contractor gets paid for any extra work required
- Permits to collaborate at the early stages of the project
  - Minimal negotiation time
  - Minimal fear of commitment by contractor
- Only have to pay for what actually costs
  - If manage closely, can save money vs. fixed-price
Cost Plus + Fixed %: Disadvantages

- **Owner shoulders all risk**
  - Little incentive to reduce costs and overtime salaries
  - can even increase costs
  - Cost unknown until contract completes
- **Owner needs to oversee construction closely**
  - Speed up slow crews
  - Identify management problems
- **Contractors have incentive to grow scope, price**
- **Terrible with turnkey delivery type!**
Applicability

- Requires sophisticated owner to manage
- Uses if the pricing could not be performed in any other way and if it is urgent
  - Emergencies (civil, military)
- Ill-defined, risky scope
  - e.g. historic building renovation with unknown cond.
  - Unknown technologies
- Either scope or construction method unknown
- Confidential projects (limit public knowledge)
Cost Plus Fixed Fee ("Fixed Fee")

- Cost may vary but the fee remains firm
- The fee is independent of the duration of the project
- Like Cost + fixed % except some shared risk
  - Less time risk: High incentive to finish early
  - Less risk of contractor growing size of project
Unit Price Contract

- Agreement on the price charged *per unit* between the contractor and the owner

- Interesting example of risk sharing
  - Owner: risk for uncertainty in quantity
  - Contractor: risk for unit price (efficiency, procur)

- Contractor overhead must be integrated in the units price

- Necessity of an owner presence on site to measure the actual quantities

- Typically renegotiate if quantity 20% off
  - Quantity influences price b/c economies of scale
Unit Price Contract

- Highly dependent on the accuracy of the estimation of the quantities given by the Owner/Designer
  - Risk of unbalanced bidding
    - If contractor believes actual quantity will differ, case increase and/or decrease the unit price
    - Contractor can make profit because payment is based on actual quantities but he can also lose money in the same way
  - A contractor can be excluded if its bid is very unbalanced
  - The total cost for the owner can be greater than planned

- Risk of unbalanced bidding
  - If contractor believes actual quantity will differ, case increase and/or decrease the unit price
  - Contractor can make profit because payment is based on actual quantities but he can also lose money in the same way
  - A contractor can be excluded if its bid is very unbalanced
  - The total cost for the owner can be greater than planned
Example: Pile Driving

- Too risky to just charge fixed price
  - Geotechnical uncertainties make length of piles uncertain
  - Piles can be highly expensive

- Risk allocation
  - Price risk more under contractor control (efficiency, crew and equipment selection): to contractor
  - Length out of contractor control: to owner

- Owner must precisely monitor length used
Cost Versus Price for GMP

Guaranteed-Maximum-Price Contract

(Price = cost of work plus fixed fee of $500 with a maximum price of $10,500)

Final Cost

$10,500
$10,000
$9,500
$10,000
$10,500

Final Price

$10,500
$10,000
$9,500

a = If final cost is $9,500, contractor profit is $500 (5.26%)
b = If final cost is $10,000, contractor profit is $500 (5%)
c = If final cost is $10,500, contractor loss is $0 (0%)

Image by MIT OpenCourseWare.

Macomber, 1989
Guaranteed Maximum Price or GMP

- **Variation of the Cost Plus a Fee** but GMP can be a cap on *direct costs*
- *After a certain point, the “floor” or “ceiling”,* the contractor assumes any additional costs
- *Often start* in cost plus fixed fee and then impose GMP at e.g. 90% design
- **Best: GM Shared Savings: Below Guaranteed Maximum**, savings shared (60-40% or sliding)
- Very good for turnkey, well-defined scope
GMP: Advantages

- Permits easier financing
- Can fast-track
- Owner keeps savings below GMP
- Often can get started quickly on construction
  - Particularly if contractor already involved w/design
- Contract may be higher than for fixed price b/c
design often not complete when contract set
GMP: Disadvantages

- Contractors may still spend lots
- Owner must monitor contractor spending
- Can be fights over what is direct vs. indirect cost
  - i.e. what must fall below GMP
- Bad if unclear scope after GMP agreed to (must renegotiate)
- Just as for CPFF, quality may be sacrificed whereas without GMP, cost and/or schedule would have increased
Relative Costs of Construction Contracts

- **E** = contractor's original estimate of the direct job cost at the time of contract award
- **M** = amount of markup by the contractor in the contract
- **B** = estimated construction price at the time of signing contract
- **A** = contractor's actual cost for the original scope of work in the contract
- **U** = underestimate of the cost of work in the original estimate (with negative value of U denoting an overestimate)
- **C** = additional cost of work due to change orders
- **P** = actual payment to contractor by the owner
- **F** = contractor's gross profit
- **R** = basic percentage markup above the original estimate for fixed fee contract
- **R_i** = premium percentage markup for contract type i such that the total percentage markup is \((R + R_i)\), e.g. \((R + R_1)\) for a lump sum contract, \((R + R_2)\) for a unit price contract, and \((R + R_3)\) for a guaranteed maximum cost contract
- **N** = a factor in the target estimate for sharing the savings in cost as agreed upon by the owner and the contractor, with \(0 \leq N \leq 1\).

Chris Hendrickson, 2000
### Original Estimated Contract Prices

<table>
<thead>
<tr>
<th>Type of Contract</th>
<th>Markup</th>
<th>Contract Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lump sum</td>
<td>$M = (R + R_1)E$</td>
<td>$B = (1 + R + R_1)E$</td>
</tr>
<tr>
<td>Unit price</td>
<td>$M = (R + R_2)E$</td>
<td>$B = (1 + R + R_2)E$</td>
</tr>
<tr>
<td>Cost plus fixed %</td>
<td>$M = RA = RE$</td>
<td>$B = (1 + R)E$</td>
</tr>
<tr>
<td>Cost plus fixed fee</td>
<td>$M = RE$</td>
<td>$B = (1 + R)E$</td>
</tr>
<tr>
<td>Guaranteed max cost</td>
<td>$M = (R + R_3)E$</td>
<td>$B = (1 + R + R_3)E$</td>
</tr>
</tbody>
</table>

Adapted from Chris Hendrickson, 2000
# Owner’s Actual Payment with Different Contract Provisions

<table>
<thead>
<tr>
<th>Type of Contract</th>
<th>Change Order Payment</th>
<th>Owner’s Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lump sum</td>
<td>$C(1 + R + R1)$</td>
<td>$P = B + C(1 + R + R1)$</td>
</tr>
<tr>
<td>Unit price</td>
<td>$C(1 + R + R2)$</td>
<td>$P = (1 + R + R2)A + C$</td>
</tr>
<tr>
<td>Cost plus fixed %</td>
<td>$C(1 + R)$</td>
<td>$P = (1 + R)(A + C)$</td>
</tr>
<tr>
<td>Cost plus fixed fee</td>
<td>$C$</td>
<td>$P = RE + A + C$</td>
</tr>
<tr>
<td>Guaranteed max cost</td>
<td>0</td>
<td>$P = B$</td>
</tr>
</tbody>
</table>

Adapted from Chris Hendrickson, 2000
## Contractor’s Gross Profit with Different Contract Provisions

<table>
<thead>
<tr>
<th>Type of Contract</th>
<th>Profit from Change Order</th>
<th>Contractor's Gross Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lump sum</td>
<td>$C(R + R1)$</td>
<td>$F = E - A + (R + R1)(E + C)$</td>
</tr>
<tr>
<td>Unit price</td>
<td>$C(R + R2)$</td>
<td>$F = (R + R2)(A + C)$</td>
</tr>
<tr>
<td>Cost plus fixed %</td>
<td>$CR$</td>
<td>$F = R (A + C)$</td>
</tr>
<tr>
<td>Cost plus fixed fee</td>
<td>0</td>
<td>$F = RE$</td>
</tr>
<tr>
<td>Guaranteed max cost</td>
<td>$-C$</td>
<td>$F = (1 + R + R3)E - A - C$</td>
</tr>
</tbody>
</table>

Adapted from Chris Hendrickson, 2000
Principles of Incentive Contracts

Additional profits are possible by lowering cost

Customer and contractor share cost savings

- Owner pays 80% of overrun
- Contractor pays 20% of overrun

- Profit is $1500 less contractor’s 20%
- Owner keeps 80% of overrun
- Contractor keeps 20% of overrun

- Profit is $1500 plus contractor’s 20%

Note: limitations may be imposed on price or profit

Kerzner, 2000
Conclusion

- When market is not very good, clients insists on fixed price bids whereas when the project offers are numerous, it is more difficult to obtain those conditions.

- The contract type choice must depend on:
  - The accuracy of the estimation
  - The ultimate cost know since the beginning or at least the maximum
  - The desired risk
  - If quick completion of work is wanted
Part III

- Award Methods
- Contract Selection
Award Methods: Contractor Selection

- **Extremes**

  Payment method: Reimbursable
  Product Type: Service
  Award method: Solicit based on Reputation and agree via Negotiation

  Payment method: Fixed Price
  Product Type: Commodity
  Award method: Bidding
Bidding

**Variants**
- Low bid
- Multi-parameter bidding
  - Low bid plus arithmetic combination of other factors
  - Low bid divided by ranking of other factors

**Fixed price low bid is win-lose**

**Typically associated with lump-sum contract**

**Prequalification critical**
Bidding Tradeoffs

- **Time provided to bidders to review documents**
  - Too long: Construction delayed
  - Too short:
    - Bids low-quality because too little time to review contract docs (incorporate high risk premium or unrealistically low)
    - Few bidders willing to participate

- **Bid count**
  - Too many bidders: Scare away best contractors
  - Too few bidders: Bid not competitive
Bidding Tradeoffs

**Advantages**
- Can get good price
- Transparency

**Disadvantages**
- Can set up win-lose situation
- Competitive pressures can eliminate profit from bid
  - Try to make up with change orders, cutting corners
  - Can lead to combative relationships
- Insufficient consideration of design before pricing
Bidding Metrics

- Most common: Price alone
- Bidding “cap”: Bid on how far can go with set amount of money
- Multi-parameter bidding (increasingly popular)
  - Consider non-price items (time, quality, qualification)
  - A+B  Additive measures
    - Price+($/day)*days (common for retail), Price+qualification+design rank, price+design rank,…
  - A/B  (e.g. B scoring along some metric: Design, etc.)
Issues with Bids

- Low bidders can be unreliable
  - Prequalify aggressively!
- To allow for fast-tracking may bid early (30%)
- Don’t try to force delivery from low bid
- Growing Frequency: innovative bidding method
- Pressure for lowest bid can create
  - Cutting corners
  - Low-quality personnel
  - Bad feelings
Bidding Process

- A/E oversight typical
- Publicity (specifies qualification requirements)
- Provide bid documents
  - Typically include fair cost estimate, sample contract
- Answer RFI's
- Pre-bid conference
  - Explain scope, working conditions, answer questions, documented in writing)
Public vs. Private Bidding

- Public Bidding
  - Must be publicly advertised (posting in newspapers, public building, etc.)
  - Qualification occurs after submission of bids
  - Typically 60 day period in which can submit bids

- Private Bidding
  - May be by invitation only
  - Qualification occurs before submission of bids
Dealing with Way-Out Low Bids

- Forcing collection from unrealistically low bids is dangerous
  - Construction highly contentious, poor morale
    - Risk of extreme corner cutting
  - Default is possible
    - Disruption
    - Insurance companies fulfilling performance bonds very difficult to work with
Subcontracting Bids

- GCs push subs for lowest possible price before GC bids
  - GC not obligated to use sub who gave bid
- Can lead to serious predatory behavior
  - Bid shopping (before \textit{and} after GC wins bid)
  - Bid peddling (unsolicited calls from subs to GCs after GC wins bid)
- Some owners/states require listing of chosen subs at bid time or assign based on sub-bidding
Qualifications

- Common items for qualifications
  - Bonds/Insurance (bid, performance, payment)
  - Safety record
  - Reputation
  - Financial strength
  - Total/Spare capacity
  - Licensing
  - Background in type of work
  - Experience in local area/labor market
  - Management system (QA, planning, estimation, control)
  - Interest, adaptability shown
Negotiation

- Typically selected based on reputation, qualifications
- Typically used for two cases
  - Very simple
    - Use trusted, familiar party
  - Very complex/big
    - Get contractor involved in design, start work early
- Requires relatively savvy owner
  - Evaluate proposals, monitor performance
- Important even for DBB for post-bid changes
Negotiation Considerations

- Can get win-win because of differences in
  - Risk preferences
  - Relative preferences for different attributes
- Goal is to find a pareto optimal agreement
- Key skill in negotiation: Ability to find win-win options
Negotiation Tips

- Try to maintain clear sense of reservation price
  - Price or conditions under which will accept offer
- Want to adopt some objective basis for position
  - Without this impersonal criteria, other party can take disagreements personally as arbitrarily demands
- Discuss multiple issues at once
  - Permits trading off issues flexibly
- Formal exposure good—but experience gives edge
Negotiation Tips 2: Major Sins of Negotiation (Thomson, 2001)

- Leaving money on the table: Failing to identify and use win-win opportunities
- Settling for too little: Unnecessarily large concessions
- Walking away from the table: Rejecting terms that are favorable, often due to pride
- Settling for terms worse than existing alternative: Pressure to reach some deal leads to opportunity less attractive than opportunity cost