



**OPPIN STATE UNIVERSITY**

**HEALTH & HUMAN SERVICES BUILDING  
BALTIMORE, MARYLAND**



CORINNE AMBLER • CONSTRUCTION MANAGEMENT • ADVISOR: DR. HORMAN

## **APPENDIX B**

### **INTERVIEW MATERIAL**

Cover letter  
Survey Questions  
Interview Notes



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## **MANAGEMENT OF THE RISK ASSOCIATED WITH MATERIAL COST ESCALATION**

My name is Corinne Ambler and I am currently a senior architectural engineering student at The Pennsylvania State University. I am pursuing a bachelor degree in the construction management option; one of the requirements is to perform a senior capstone project that relates to a current construction project.

The construction project that my thesis focuses on is a five-story academic facility for Coppin State University located in Baltimore, Maryland. The project had some difficulties with material escalation especially because Hurricane Katrina hit during the bidding of the project. I am expanding my research to include the entire industry.

The goal of this research project is to address the following questions:

1. How can owners, designers, construction managers, and contractors manage the risk of volatile materials?
2. How will using alternate materials impact the construction process?

After analyzing the answers of the four different parties, I will propose a tool that will allow each party to evaluate the risk associated with the use of each volatile material in the project.

By responding, I would like to schedule a thirty-minute phone conversation to discuss this study. Please let me know your availability. Thank you in advance for taking the time to participate in this study. Your insight will allow for a better understanding of the issues associated with this topic. Please feel free to contact me with any questions.

Respectfully,

**Corinne Ambler**

The Pennsylvania State University

Bachelor of Architectural Engineering Candidate

Phone: 215.850.6755

Email: [cra140@psu.edu](mailto:cra140@psu.edu)

<http://www.arche.psu.edu/thesis/eportfolio/2007/portfolios/CRA140/>

## Material Escalation Survey for Contractors

Name of Company:

Please check your area(s) of construction expertise.

- |  |  |
|--|--|
| <input type="checkbox"/> Mechanical    | <input type="checkbox"/> Concrete                |
| <input type="checkbox"/> Electrical    | <input type="checkbox"/> Masonry                 |
| <input type="checkbox"/> Steel         | <input type="checkbox"/> Miscellaneous Metals    |
| <input type="checkbox"/> Glass Systems | <input type="checkbox"/> Fire Protection         |
| <input type="checkbox"/> Metal Panels  | <input type="checkbox"/> Ceilings and Partitions |

Which material(s) create the most risk when bidding/procuring a project?

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> Copper   | <input type="checkbox"/> Steel    |
| <input type="checkbox"/> Glass    | <input type="checkbox"/> Drywall  |
| <input type="checkbox"/> Aluminum | <input type="checkbox"/> Concrete |

How do you manage the risk involved with material cost escalation (check all that apply)?

- Pre-purchase of volatile materials in bulk
- Contract Clauses
- Increased bid

Do you incorporate a multiplier in your material estimate for the escalation of material prices?

- Yes       No

If yes, how much of your total bid?

- 1-5%
- 5-10%
- 15-20%
- 20-30%

How many different suppliers do you typically have for one material?

- |                            |                             |
|----------------------------|-----------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 3  |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 4+ |

How long will a supplier hold their price?

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> 1-14 Days  | <input type="checkbox"/> 15-29 Days |
| <input type="checkbox"/> 30-59 days | <input type="checkbox"/> > 60 Days  |

Please list any other methods used to combat material escalation or any comments you have.

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## Material Escalation Survey for Designers

**What is your area of design expertise?**

- Architect       Mechanical  
 Structural       Electrical  
 Other \_\_\_\_\_

**Please check your area(s) of expertise.**

- Academic - University       Office Building  
 Academic University       Specialty  
 Health Care/Lab       Sports Facility  
 Hotel/Condo       Other  
 Industrial

**Is volatility of material prices a factor in the design process?**

- Yes       No

**Please rank the materials as they affect the design. (1-Most 6-Least)**

- Copper       Steel  
 Glass       Drywall  
 Aluminum       Concrete

## Material Escalation Survey for Construction Managers

**Who is your typical owner?**

Public     Private     Both

**What types of buildings do you build (check all that apply)?**

Academic                       Office Building  
 Health Care/Lab               Specialty  
 Hotel/Condo                    Sports Facility  
 Industrial                         Other

**What material prices typically affect the budget the most?**

Copper                       Steel  
 Glass                         Drywall  
 Aluminum                   Concrete

**How do you compensate for the cost of material escalation (check all that apply)?**

Value Engineering  
 Pre-purchase of volatile materials  
 Contingency for each material  
 General Contingency  
 Contract Clause

**For hard bid projects (GMP) do you include a mark-up for material escalation?**

Yes     No

**If yes, how much of the project cost?**

1-5%  
 5-10%  
 15-20%  
 20-30%

**After project award, do you re-estimate the cost before bidding the project to sub-contractors?**

Yes     No

## Material Escalation for Owners

How are your projects typically funded?

- Public     Private

What types of buildings do you own/build (check all that apply)?

- Academic                       Office Building  
 Health Care/Lab                 Specialty  
 Hotel/Condo                     Sports Facility  
 Industrial                         Other

Do you take cost escalation into account when planning a project?

- Yes - Just General Inflation  
 Yes - Inflation and Cost Escalation  
 No

Do you put money aside for the increase in material prices when allocating your budget?

- Yes     No

If yes, how much of your budget?

- 1-5%  
 5-10%  
 15-20%  
 20-30%

Which would you prefer?

- A higher and more accurate cost estimate  
 A lower cost estimate that has the ability to change at any given time

If you would prefer a higher but more accurate cost estimate

What percent more of your total budget are you willing to pay?

- 1-5%  
 5-10%  
 15-20%  
 20-30%

Would you prefer contractors to have a separate contingency for material escalation?

- Yes     No



## MATERIAL ESCALATION INTERVIEW NOTES

### CONSTRUCTION MANAGERS

#### Bob Grottenthaler

- Glass- long lead time for raw materials mean very long lead time for finished product
- Steel used for structure and reinforcing - has no good alternate
- Concrete - increased due to petroleum prices more expensive to manufacture & truck
- Copper - just for pipes and wire
- Masonry - Expensive due to lack of skilled masons - labor cost very high
- Global economy changed - 1-2 weeks started taking 6-8 weeks some suppliers only gave part of order (30 of 50 valves at first) can delay schedule
- Value Engineering - happens after bid - if budget is over 5% or less
- Pre-purchase of materials - contractor has better relationship with supplier to lock in. Risky and harder for CM to get a better price
- CM needs to make sure all scopes cover everything and don't double cover if pre-purchase mechanical equipment make sure contractor has start-up and training in scope
- General Contingency - established in GMP - Market Contingency - owner can store too much money and then not have enough for brick and mortar
- Have contractor do base bid and then deduct/add alternates according to material prices too may alternates are undesirable to contractor make base bid due first and alternate after vendors like to give price at last minute especially light fixtures and gear
- China has bought up a lot of materials which leaves shortages
- Create a reasonable escalation percentage during estimate phase
- Architects and Designers make it difficult with proprietary specifications which makes it difficult for the contractor to acquire materials
- Award to subcontractors as early as possible
- After project awarded to CM scope is written then each scope is estimated to compare to actual bid received from contractor
- Budget way over after bid - owner sometimes ask shell out area and will fit it out later
- Work with low bidder to let them know they are the lowest but they are still over budget - allows contractor to know they can get the work if they need it
- Re-bid to get in budget sometimes after 2-3 weeks can get new contractors - need to reject all from first bid and increase competition
- In a hard bid may not get a bid for each spec section
- Hard for contractor to hold bid price and keep bid bond

## Lee Evey

- Escalation is a function of time - the longer it takes to produce the more expensive it becomes
- Design Build's duration is shorter than design-bid-build so the time is already decreased
- CIAA - Sanveto and Mark Conchar paper
  - 6% less expensive than design-bid-build
  - 12% saved in construction
  - 33% saved in program
- Usually everyone pushes off the risk to someone else and the owner starts the push - it gets pushed all the way down to the contractor
- Design Build gives each party an appropriate portion of risk
- It is effective because it enables interaction between people which causes communications about software and materials
- when oriented as a TEAM more likely to solve problems together which reduces the total risk
- Example- Pentagon
  - Create and Award Fee and incentive features - causes more teamwork and reliance on other parties
  - Award fee is a profit opportunity
  - Owner/CM controls the fee and contractors bid on pure cost without inflation
  - Materials basket used for cost escalation
  - Design-bid-build there is no motivation for contractor to work with owner - the owner just wants the lowest cost and the project is more likely to have change orders because the contractor under-bid the project
  - each contractor is asked to propose the best product the contractor knows the budget and his fee and needs to respond to owners - goal, challenges, problems, constraints, and budget
- This method forces contractors to think outside of the box and come up with good solutions to earn their 10% fee (which is unheard of)
  - owner has already set aside 10% of budget for fees
  - contractors want to be part of the project because it is a great opportunity to make a big profit
- gets everyone away from price based competition and focuses on more solutions for a successful project
- Contractor is evaluated on quality, effective communication, and safety every three months - must pass evaluation to receive all of profit (live up to their end of the agreement)
- Forms a high quality project from good behaviors
- if the contractor can do what he said he can do and save money then the contractor and owner split the savings 50/50
- establishes a strong relationship between the owner and the contractors
- Escalation controlled by a source selection process
- Two parts of the bidding
- First part anyone can bid and the owner looks at past performance - includes team and experience - recently, relevancy, quality
- Three parties are selected to compete in next part of selection
- Phase two is when the 3 competitors respond to the goals, challenges, problems, constraints, and budget
- A performance requirement is agreed upon - quiet, clean and quality - all pre-defined
- Everyone has a fair proportion of risk otherwise game of roulette for contractors



- Price everything in today's prices and then take escalation into account each quarter
- Market Basket- steel, concrete, drywall, and copper - escalation covered by owner
- Current bids- "rip them and read them" award to the biggest liar
- BIM, VE, Sustainability, Commissioning operate poorly in design bid build
- BIM is a database and produces a report for design, material list, renderings, schedules
- Design Build decreases/eliminates schedule over-run litigation

#### **Sarah Forrest - Estimator**

- Calculation of material escalation depends on material of building and time frame
  - if notice to proceed is soon may not include anything for material escalation
  - if long negotiated job then use Beck's index (historical index) and have relationship with new-core steel mill to get flyer monthly with the change (up or down) in steel prices - new core works with structural shapes and rebar
- HP has graphed the monthly reports from new core as an extra tool
- 3 months ago steel leveled off now it has started to increase again
- have a similar process for tracking cement
- rely heavily on subs for copper and drywall escalation
- ENR has index and can be good reference for copper and drywall
- Can become a problem in volatile market, pay too much of a premium for something that will never happen
- Past example: agreement with sub for rebar HP would get a quarterly review of price increase and adjust payment to sub accordingly for the amount delivered to site that quarter
- If owner is willing can change materials - copper to aluminum or aluminum to copper
- In some contracts owners carry risk and create a similar situation with HP as the rebar sub
- For a GMP give most of the risk to the subs
- If early enough in design HP will take risk and manage it until they can sell it off to the subs
- Design Build is a very good way to manage material escalation
- work hard with architect and check budget daily to manage costs
- one project concrete and steel was designed and then picked according to price

#### **Mike Miller**

- Pre-purchase steel and copper that can be used on most jobs.
- Buy in bulk using a 30-day look ahead
- Hurricane Katrina impact on oil rigs increased price of PVC piping
- Supplier and Contractor have include escalation in price
- Commodity items can hold price for 90 days
- Buy from multiple vendors/mills based on supply and demand
- Carry contingency for escalation
- Can change materials for VE - Copper, Galvanized, and Stainless Steel
- Cast iron very high consider using plastic
- 95% of projects are in-house design and construction
- In-house helps with over designs that waste material and creates more constructible solutions
- Keep the same amount of contingency for escalation

## **ECONOMIST**

### **Ken Simonson**

- Chief economist for Associated General Contractors of America
- Job is to keep people informed about material price inflation and trends
- Provide documentation for owners on behalf of contractor to justify dramatic increase in material prices
- Membership of organization is all contractors so that is who he mainly deals with
- Contractors have varied opinions on willingness to participate in design build
- Best way contractor manage risk
  - work with owner and designer at early phase to allow them to realize volatility
  - owner can consider providing separate pricing to reduce contractor risk
  - allow contractor to buy materials early to lock in price
  - contractor includes widest range in price
- CM risk depends on flexibility of the owner to get more money
- Very little to no designer interaction (unfortunately more true than should be)
- Owners need to increase their awareness in order to adapt to availability of materials
- Katrina and Rita cause PVC pipe and insulation harder to make due to increase
  - steel, diesel fuel, gypsum, copper
  - cement increase 10% each year in last 3 years lots of energy goes into processing and shipping

## **OWNER**

### **Jorge Scotti**

- Develop cost of building then develop percentage for escalation.
- General inflation and market conditions taken into account
- Amount depends on size and length of project around 3-6%
- Take out a contingency for unforeseen conditions
- Bid out to contractors and assume that escalation is taken into their bid amount
- Contractor responsible for all of risk
- Award to lowest bidder
- If bid comes in high - ask state for more money or revise scope of project
- State of Maryland will not approve a higher price unless documentation is provided
- Contract is fixed number
- 10-15% of projects are design build

## **DESIGNER**

### **Merton Harris - Mechanical**

- Designs academic, and health care/lab facilities
- Steel is the #1 most volatile
- Takes the volatility of materials into consideration when designing but can't say how
- Will change the design if the budget is over as long as the building is still functional
- Some materials come into play when asked to VE but most are un-changeable

### **Matt Herbert - Architect**

- DCI has own estimator who checked BMC's estimate after each submission
- Building material is picked to perform a certain way and the budget is a second consideration
- The right design is addressed first for the area/campus/owner
- Building envelope tends to affect the budget the most

### **Hope Furrer - Structural**

- Two or three alternate studies (systems) are considered
- An estimate is performed by the construction manager for each system
- Then a system is selected

## **CONTRACTOR**

### **David Allen Company - Ceramic, Terrazzo, marble**

- Pre-purchase volatile materials in bulk
- Increases bid
- Multiplies bid by 5-10% for escalation of material prices
- 3 different suppliers
- Supplier will hold price for ceramics for one year and 60 days for stone

### **Homewood General Contractors - Concrete, Lumber, Specialty (doors and hardware)**

- Uses contract clauses for specialty items
- Increases bid for lumber and concrete
- Multiplies 5-10% for escalation of material prices
- Uses just one supplier
- Supplier will hold price for 30-59 days

### **Finishes Inc - Ceilings and Partitions**

- Believes drywall and steel create most risk when bidding and procuring
- Uses contract clauses to manage risk
- Multiplies bid by 5-10% for escalation of material prices
- Uses one supplier
- Supplier will hold prices for sixty days or more
- After letter of intent is sent ask vendors for "vendor quote sheets" so prices can be compared. Tell vendor how long they need them to hold prices but most will not hold for more than one year

### **Zephyr Aluminum - Glass Systems**

- Believe that glass and aluminum is the riskiest
- Uses contract clauses and increases bid to manage the risk
- Does not incorporate multiplier for material escalation
- Uses three different suppliers
- Supplier will hold price for 30-59 days

### **MBR Construction Services - Electrical**

- Believes copper, aluminum, and steel have most risk
- Pre-purchases volatile materials in bulk
- Multiplies bid by 5-10% for material escalation
- Uses 3 different suppliers
- Supplier will hold price for 1-14 days

- Electrical is a two step process - run the raceway (being conduit or cable tray made of steel or aluminum) and install the process thru the first system being copper, aluminum, or fiber cable

### **Sody Concrete**

- Concrete and rebar
- It is a back and forth whether cost of cement or steel (rebar) is the driver for increase in concrete bids (relative to the time of year)
- Rebar escalation \$25/ton increase per quarter - projected escalation
- Cement Escalation - on average 3-5% increase
- Uses contract clauses a little mainly increases bid (padding 5-10%)
- Price of lumber for formwork has also escalated which in turn increases concrete bid
- 4 different ready mix vendors
- Use 2 rebar subs mainly 1 due to a good relationship
- Ready Mix vender will hold prices for one year
- Rebar vendor will hold price for 2-3 months