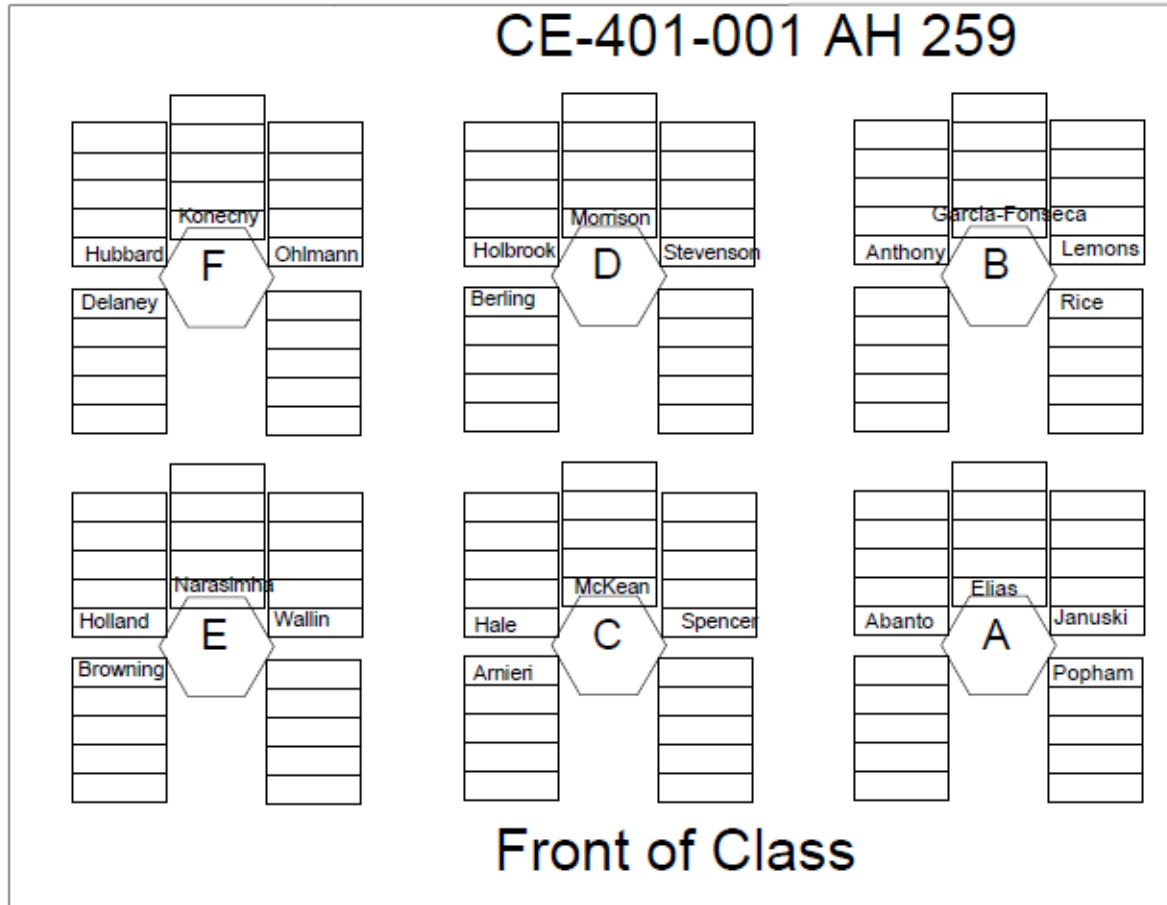




CE 401 Civil Engineering Seminar

Please Take Your Assigned Seat:

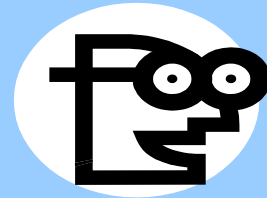
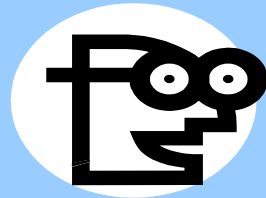
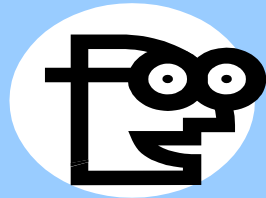
Catsgo4nineN-18





E 401 Civil Engineering Seminar

General Questions:



It's QUESTION TIME !!



CE 401 Civil Engineering Seminar

Seminar Procedures

CE-401 Information

- To resolve Issues:

- Need to bring all issues about CE-401 to me ce-401@Windstream.net; and
- Need to bring all CANVAS issues to buddy.hall@uky.edu, and me.

- How To Reach Me:

- Communications with me MUST be by email ce-401@windstream.net for:
 - Discussion Group Formation
 - Essay Group Formation
 - Essay Submittal
 - Pin Number Requests
- For all other contacts, you may use email or CANVAS IM

- CE-401 Webpage:

- http://richardcheeks.com/professor/New%20Front%20Page%20Format/CE-401_Front_Page.htm



CE 401 Civil Engineering Seminar

Seminar Procedures

CE-401 Information

- **Class Schedule allocates 1:50 (110 Minutes) for each session**
 - **Goal is to use 60 to 80 minutes in class most weeks depending upon our ability to focus on the discussion questions and how many rabbits we chase**
 - **Exceptions: The 3 Conflict Resolution Workshop Weeks will require full 2 hrs.**
- **Only On Campus Friday, OHR 369 (Across from break area) Typical Friday Schedule:**
 - **Office 7:15 am to 7:45 am;**
 - **Class 7:50 am to 9:10 +/-;**
 - **Office 9:15 +/- to 10:45 am;**
 - **In Class 10:50 am to 12:10 +/-; and**
 - **Will stay after class as needed for course related purposes**
- **Weekly Power Points and other material available for download**
 - **<http://www.engr.uky.edu/~jrchee0/CE%20401/>**
 - **You will need this link to access this and future PowerPoints.**
 - **Tons of additional Information that you may find useful during career**
 - **I will post the PDF of the PowerPoints each Friday**



CE 401 Civil Engineering Seminar Seminar Procedures

CE-401 Information Already Released via CANVAS

- **CE-401 Syllabus.pdf**
- **CE-401_IMPORTANT_INFORMATION_FOR_STUDENTS.pdf**
- **DISCUSSION GROUP PROCEDURES.pdf**
- **ESSAY.pdf**



CE 401 Civil Engineering Seminar

Seminar Procedures

CE-401 Information Available via CANVAS

•Syllabus

- NO Use of electronic devices in class without my prior approval, and
- Attendance and tardiness are major issues; Be Here! Be here on time!

•Important Information Document

- CE-401 Webpage and Access to GRADES area
- Other resources available

•Procedures for Weekly Group Discussions

- Become familiar with the procedures and follow them
- Establish your discussion groups by Monday by email to me per the Procedures.
- If I don't respond to your email, it is because I did not get the email.

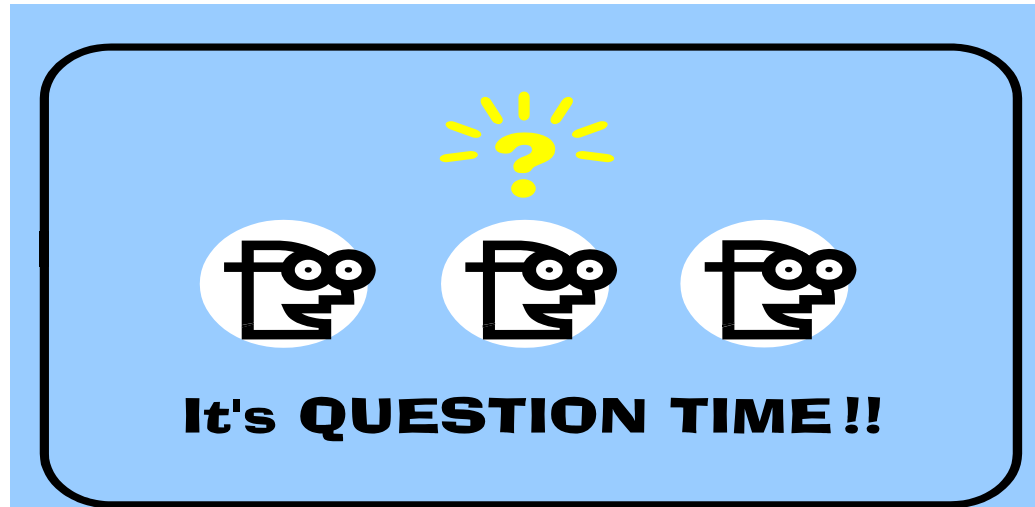
•Essay Assignment-Essay Due Date, March 10, 2023

- Watershed event for final grade in CE 401
- “Incident At Morales” – Essay Subject Material
- Need to Understand the assignment before writing-Bring questions to me
- Establish your essay teams by Friday by email to me per the Assignment.
- If I don't respond to your email, it is because I did not get the email.



CE 401 Civil Engineering Seminar

Seminar Procedures



- Are there questions about my attendance/tardiness policy?
- Are there questions about the consensus building process?
- Are there questions about my expectations?
- Please do not hesitate to bring questions forward sooner rather than later, and Email questions as they arise between Fridays.



CE 401 Civil Engineering Seminar

QUIZZES:

Quizzes

- **10 Quizzes Worth Total 120 Points**
 - **1st and 10th quizzes worth 20 points each,**
 - **2nd through 9th quizzes worth 10 points each**
- **Quizzes are timed, 1 minute per point**
 - **Quizzes will occur each Thursday**
 - **Quizzes open at noon and close at Midnight.**
 - **Contact me in advance if you require additional time or a different time window to take a quiz.**



CE 401 Civil Engineering Seminar

QUIZZES:

Quizzes

- **Quizzes are an INDIVIDUAL ACTIVITY**

- Quizzes provide one measurement of individual work required by ABET.

- In practice, many activities are collaborative while some require individual effort. This requirement emulates the individual aspect of that reality

- Do not collaborate on quizzes. CANVAS reveals collaboration



CE 401 Civil Engineering Seminar

QUIZZES:

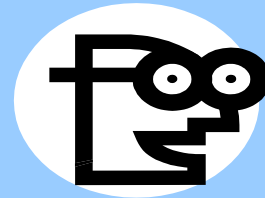
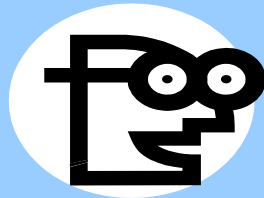
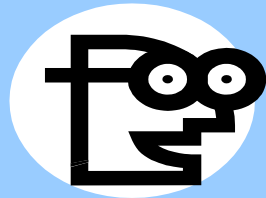
Quiz Questions

- **Basis For Questions:** In-class discussions, Readings, videos, etc. prior to the quiz.
- **Questions are Primarily Multiple Choice with some True-False**
 - **Multiple Choice questions:** 2 points each
 - **True-False questions:** 1 point each



E 401 Civil Engineering Seminar

QUIZZES:



It's QUESTION TIME !!



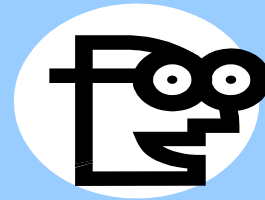
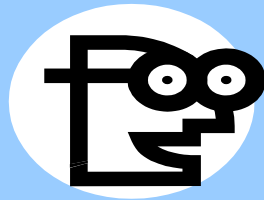
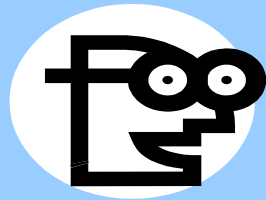
CE 401 Civil Engineering Seminar

Procedures for Each Week:

- **The weekly discussion questions prepare you for the next class meeting**
- **This week's activities are a "dry run" with the process**
 - **Members should post initial Responses to questions by Tuesday Midnight**
 - **The leader should develop and post the group's consensus by Thursday Midnight**
 - **The Group Leader is primary spokesperson in class for the group on the assigned discussion question**
 - **Points are deducted for late or no participation**



E 401 Civil Engineering Seminar Procedures for Each Week:



It's QUESTION TIME !!



CE 401 Civil Engineering Seminar Introduction & Incident At Morales Discussion Groups Week 01

Spring 2023 Teams For Section 01 For Week 01 Only

A	Abanto	Elias	Januski	Popham
B	Anthony	Garcia Fonseca	Lemons	Rice
C	Arnieri	Hale	McKean	Spencer
D	Berling	Holbrook	Morrison	Stevenson
E	Browning	Holland	Narasimha	Wallin
F	Delaney	Hubbard	Konecny	Ohlmann

- Need to establish fixed groups for rest of the semester by Monday afternoon, submitted by email.
- There will be 6 groups with 4 members



CE 401 Civil Engineering Seminar Introduction & Incident At Morales

Permanent Discussion Group Formation Status

SECTION 1 DISCUSSION GROUPS					
	1	2	3	4	5
A	Browning	Delaney	Januski	McKean	
B	Arnieri	Berling	Elias	Hubbard	
C					
D					
E					
F					

STATUS OF SECTION 1 GROUP FORMATION				
Groups	Students	Filled	Remaining	Groups, Section 1
6	24	Groups	16	Students
6	4 Person	2	4	4 Person Groups

**These Tables will populate on the CE-401 Webpage
as group formation proceeds**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Timely Initial Posts: 47.2%			Current Participation: 1		Last Update 13-Jan-23 7:13 AM		
Section 1			Week 1 Discussion Question Activity Report				
Question	Group	Leader	1	2	3	4	5
1	A	Abanto	Abanto	<i>Elias</i>	Januski	Popham	
1	C	Arnieri	<i>Arnieri</i>	Hale	<i>McKean</i>	Spencer	
1	E	Browning	<i>Browning</i>	<i>Holland</i>	Narasimha	<i>Wallin</i>	
2	B	Garcia Fonseca	Anthony	Garcia Fonseca	Lemons	Rice	
2	D	Berling	<i>Berling</i>	<i>Holbrook</i>	<i>Morrison</i>	Stevenson	
2	F	Hubbard	<i>Delaney</i>	<i>Hubbard</i>	<i>Konecny</i>	<i>Ohlmann</i>	
3	A	Popham	Abanto	<i>Elias</i>	Januski	Popham	
3	C	Hale	<i>Arnieri</i>	Hale	<i>McKean</i>	Spencer	
3	F	Delaney	<i>Delaney</i>	<i>Hubbard</i>	<i>Konecny</i>	Ohlmann	
4	B	Anthony	Anthony	Garcia Fonseca	Lemons	Rice	
4	D	Morrison	<i>Berling</i>	<i>Holbrook</i>	<i>Morrison</i>	Stevenson	
4	E	Narasimha	<i>Browning</i>	<i>Holland</i>	Narasimha	<i>Wallin</i>	
5	A	Elias	Abanto	<i>Elias</i>	Januski	Popham	
5	D	Holbrook	<i>Berling</i>	<i>Holbrook</i>	<i>Morrison</i>	Stevenson	
5	F	Ohlmann	<i>Delaney</i>	Hubbard	Konecny	<i>Ohlmann</i>	
6	B	Rice	Anthony	Garcia Fonseca	Lemons	Rice	
6	C	McKean	<i>Arnieri</i>	Hale	<i>McKean</i>	Spencer	
6	E	Holland	<i>Browning</i>	<i>Holland</i>	Narasimha	<i>Wallin</i>	

Font Legend			
non-bold	No post made, time for posting remains	non-bold	Late Post before consensus, 20% loss
Bold	Post made within Time	Bold	Post is made after consensus, 60% loss
Non-Bold Leader-	No Consensus Posted, -5 Points	<i>Ital. non-bold</i>	<i>No Post Made, 100% loss</i>



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question Activities Week 01

- **For the most part, this week was a good start with the discussion questions**
- **Some student responses did not seem to address the question posed. Be sure to answer the specific question I am asking**
- **A few student responses indicate a lack of reading or reading comprehension. Bring questions about the readings to me by email when they arise. Attempts to answer these questions without reading and comprehending are obvious.**



CE 401 Civil Engineering Seminar Introduction & Incident At Morales

Discussion Question Activities Week 01

- Participation rates for initial posting by the Tuesday deadline and post at any time was typical for first week activities.
- Participation rates moving forward need to increase as they have in the past.

	WEEK 01 PARTICIPATION RATES				WEEK 02 PARTICIPATION RATES			
	Week/Sect	1-1	Week Sect	1-2	Week/Sect	2-1	Week Sect	2-2
	Initial Posts	Posts	Initial Posts	Posts	Initial Posts	Posts	Initial Posts	Posts
Spring 23	47.2%	100.0%	74.1%	93.8%				
Fall 22	52.2%	91.3%	65.0%	100.0%	87.0%	100.0%	100.0%	100.0%
Spring 22	50.8%	90.5%	65.3%	93.1%	85.7%	100.0%	95.8%	100.0%
Fall 21	42.2%	95.6%	47.8%	89.9%	93.3%	100.0%	100.0%	100.0%
Spring 21	27.8%	77.8%	53.0%	95.5%	94.4%	100.0%	100.0%	100.0%
Average	43.2%	88.8%	57.8%	94.6%	90.1%	100.0%	99.0%	100.0%
Combined Sections	50.5%	91.7%			94.5%	100.0%		



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 1

Ernest Greenwood wrote over 60 years ago that a profession is distinguished from non-professional occupations by five attributes, all of which exist with the professions while non-professional occupations may satisfy some, but not all of these professional attributes. Society grants Professional Status to a certain few occupations to protect important public interests; however, the government does NOT grant professional status to most occupations because of the absence of these important public interests. The Professional Status provides a profession certain market protections that are tantamount to a government sanctioned monopoly in exchange for the profession's commitment to protect these important public interests because the government cannot protect those public interests without the profession's commitment to do so. These public interest protections in exchange for the market protections form a social contract between a profession and society.

- a) What is the primary protection that this social contract between the Public and the Engineering Profession provides the public in exchange for its government sanctioned monopoly?
- b) How does the engineering profession assure the public regarding these public interests?
- c) Identify at least 3 reasons why occupations seek this government sanctioned monopoly.

A Abanto

C Arnieri

E Browning



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 1

a) What is the primary protection that this social contract between the Public and the Engineering Profession provides the public in exchange for its government sanctioned monopoly?

Profession promises that it will protect public health, safety and welfare above all other concerns, AND in exchange, The Government authorizes the Profession to self regulate, e.g., determine requirements for membership including education, training, apprenticeship, conduct, and prohibit non-members from competing with members. This is tantamount to a government sanctioned monopoly

b) How does the engineering profession assure the public regarding these public interests?

The primary precept of the profession's code of ethics requires each member of the profession to protect the public health, safety and welfare above all other concerns, including personal gain and profit.



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 1

c) Identify at least 3 reasons why occupations seek this government sanctioned monopoly.

- 1) To restrict competition**
- 2) To increase income (compensation)**
- 3) To gain prestige and recognition**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 2

ASCE's Aspirational vision says that the Civil Engineering profession and Civil Engineers should be in a leadership role in the public debate on environmental policy and infrastructure policy.

a) Explain in 2 to 3 sentences why ASCE has adopted this aspirational vision of the leadership role that the Civil Engineering Profession should hold in the nation's public policy debate on the environment and infrastructure.

b) Explain in 2 or 3 sentences why you either agree or disagree with ASCE's Aspirational vision that the Civil Engineering Profession should lead the U. S. public policy debate on environmental and infrastructure policy.

b) Based on recent infrastructure report cards, explain whether ASCE's vision is a call for change or a call for the continuation of the status quo with regard to the role the Civil Engineering Profession has had in the public policy debate on environmental and infrastructure policy over the last 2 decades.

B	Garcia Fonse
D	Berling
F	Hubbard



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

Some engineers have noted that they can work "fast, good and cheap" and their "clients can pick any two". This assertion stands for the proposition that engineers can work fast and good, but not cheap; fast and cheap, but not good; or good and cheap, but not fast on any particular assignment. This assertion also stands for the proposition that engineers cannot simultaneously excel in all 3 attributes.

- | | | | |
|----|---|---|---------|
| a) | Define the terms "fast," "good," and "cheap" when used in the context of an engineer's proposal for engineering design services submitted to a client. For example, "A client will conclude your design will be completed "Fast" if the proposal promises | | |
| b) | Is the assertion that engineers cannot work "fast, good and cheap" simultaneously right or wrong? | A | Popham |
| c) | In 2 or 3 sentences explain the basis for your conclusion in b). | C | Hale |
| | | F | Delaney |



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

Some engineers have noted that they work "fast, good and cheap" and their "client may choose any two". This assertion means engineers can work fast and good, but not cheap, fast and cheap, but not good, or good and cheap, but not fast, but it also means engineers cannot achieve all 3 attributes in their work simultaneously.

Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?

- 1. A client will conclude your design will be completed "Fast" if the proposal promises to complete the design much sooner than usually required for the type of project under consideration**
- 2. A client will conclude your design will be completed "Good" if the proposal promises to provide high quality design that will result in lower construction and life cycle costs than usually experienced for the type of project under consideration**
- 3. A client will conclude your design will be completed "Cheap" if the proposal promises to perform the design for a fee that is significantly lower than the fee usually required to design the type of project under consideration.**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

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Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?

- 1. What is the most important component required to give clients high quality (work good) in engineering design?**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

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Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?

1. What is the most important component required to give clients high quality (work good) in engineering design?
Experienced, talented engineers!
2. If an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)?



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

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1. What is the most important component required to give clients high quality (work good) in engineering design?
Experienced, talented engineers!
2. If an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)? **Cheap Labor**
3. **How does working fast, i.e., to finish a final design in 5 weeks instead of the usual 5 months (work fast) affect the company's operating cost and work quality?**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 3

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Experienced, talented engineers!
2. If an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)? **Cheap Labor**
3. How does working fast, i.e., to finish a final design in 5 weeks instead of the usual 5 months (work fast) affect the company's operating cost and work quality? **Cost tend to rise, and quality tends to fall.**



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 4

Mark Zweig observes, "The only strategy that really makes sense for a professional services firm is one of high quality and high price." Zweig then concludes that "Engineering firms that are trying to be the lowest-cost providers in the market sectors are destined for failure."

- In the first statement, do you believe that Zweig is asserting that a professional services firm that strives to be a "low cost" provider in the market sectors cannot maintain "high quality"? Explain the basis for your response in 2 to 3 sentences.
- Do you believe an engineering firm can routinely deliver the highest quality services for the lowest cost in the market sectors? In 2 to 3 sentences, explain why you reached this conclusion. (Routinely means consistently doing so in the usual course of business rather than merely possible under certain limited circumstances.)
- With respect to Zweig's second statement, define what you think Zweig means by "failure" and explain whether and why you agree with Zweig that an engineering firm that strives to be the "lowest cost" provider in the market sectors is destined for failure.

B

Anthony

D

Morrison

E

Narasimha



CE 401 Civil Engineering Seminar Introduction & Incident At Morales

Discussion Question 4

Are the answers to part a and b the same for all professional services, whether engineering, architecture, medicine, law, nursing, ... , and why?



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 4

Mark Zweig observes, 'The only strategy that really makes sense for a professional services firm is one of high quality and high price. ... Firms that are trying to be the lowest-cost providers in the market sectors are destined for failure.' In 2 or 3 sentences, why is Zweig right or wrong that 'lowest cost' and 'high quality' are incompatible.

3. Consider an engineering company with 10 total employees and costs on \$2,000,000 Gross Revenue.

<i>Payroll (including all payroll burden cost):</i>	<i>\$1,000,000</i>
<i>Insurance (Facilities, CGL, PLI, Key Man, Autos):</i>	<i>\$240,000</i>
<i>Supplies (Office and Field):</i>	<i>\$160,000</i>
<i>Facilities (Rent, Utilities, Repair/Maintenance):</i>	<i>\$120,000</i>
<i>Equipment (Purchase, Repair/Maintenance):</i>	<i>\$100,000</i>
<i>Training and Recruiting:</i>	<i>\$50,000</i>
<i>Business Development, Marketing:</i>	<i>\$30,000</i>
<i>Project Direct Costs (travel, equipment, etc.):</i>	<i>\$100,000 to \$200,000</i>
<i>Profit (Is Not A Dirty Word):</i>	<i>\$100,000 to \$200,000</i>

To be lowest-cost provider, it must cut gross revenue by \$200,000 while executing the same amount of work.

What is the most effective way for this company to cut its cost in order to be competitive as the lowest cost engineering company in its market?



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 4

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<i>Supplies (Office and Field):</i>	<i>\$160,000</i>
<i>Facilities (Rent, Utilities, Repair/Maintenance):</i>	<i>\$120,000</i>
<i>Equipment (Purchase, Repair/Maintenance):</i>	<i>\$100,000</i>
<i>Training and Recruiting:</i>	<i>\$50,000</i>
<i>Business Development, Marketing:</i>	<i>\$30,000</i>
<i>Project Direct Costs (travel, equipment, etc.):</i>	<i>\$200,000 to \$100,000</i>
<i>Profit (Is Not A Dirty Word):</i>	<i>\$100,000 to \$200,000</i>

To be highest-cost provider, it must increase gross revenue by \$200,000 while executing the same amount of work.

What is the most effective way for this company to use the additional revenue it generates from this fee increase, and why?



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 5

When a client procures (purchases) design professional services, the client can select the design professional based on the design professional's experience and qualifications (Qualification Based Selection, QBS), or the client can select the design professional based on the fee that the design professional bids to provide the requested services (Competitive Bidding).

- Which of these two methods (QBS or Competitive Bidding) does the engineering profession support for the procurement of design professional services?
- Please explain in 2 to 3 sentences why the profession has adopted this position.
- Rank each of the following types of clients, on a sliding scale of 1 (Absolutely Uses Competitive Bidding) to 10 (Absolutely Uses QBS), regarding the likelihood that the client will procure engineering services using either Competitive Bidding or QBS, and for each situation, explain your ranking in 1 to 2 sentences each.
 - A national, **publicly traded business** with facilities at many locations hiring design professionals to design a new facility in Kentucky.
 - The Kentucky Transportation Cabinet hiring design professionals to design a new highway in Kentucky
 - A locally owned private business owner with one business facility located in his Kentucky hometown hiring design professionals to design a new facility to replace the existing facility in the same Kentucky town.

A	Elias
D	Holbrook
F	Ohlmann



CE 401 Civil Engineering Seminar Introduction & Incident At Morales

Discussion Question 5

When a client hires an engineer to perform services, the client can do so based on the experience and qualifications of the engineers he considers (Qualification Based Selection, QBS), or the client can do so based on the fee these engineers charge for their services (Competitive Bidding).

Which type of client is most likely, more likely, and least likely to use QBS to hire a design professionals, and why?

Client Type	Least	More	Most
Sophisticated Private Sector Owners	_____	_____	_____
Unsophisticated Private Sector Owners	_____	_____	_____
A Governmental Agency	_____	_____	_____



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 5

When a client hires an engineer to perform services, the client can do so based on the experience and qualifications of the engineers he considers (Qualification Based Selection, QBS), or the client can do so based on the fee these engineers charge for their services (Competitive Bidding).

Which type of client is most likely, more likely, and least likely to use QBS to hire a design professionals, and why?

Client Type	Least	More	Most
Sophisticated Private Sector Owners	___	<u>X</u>	___
Unsophisticated Private Sector Owners	<u>X</u>	___	___
A Governmental Agency	___	___	<u>X</u>



CE 401 Civil Engineering Seminar

Introduction & Incident At Morales

Discussion Question 6

Competitive Bidding vs. Qualification Based Selection.

The Federal Government adopted the Brooks Act (PL 92-582) which says, "The Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services, and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices." A majority of the states have adopted state versions of the Brooks Act. In contrast, the government almost always uses competitive bidding to hire its construction contractors.

- a) For QBS and Competitive bidding, what factor is most important to the purchaser of the product or service?
- b) When a client procures design professional services using QBS, explain in 2 or 3 sentences the role that the design professional's fee plays in the QBS process.
- c) When a client procures design professional services using competitive bidding, explain in 2 or 3 sentences the role that the design professional's experience and qualifications play in the competitive bidding process.
- d) In 3 to 4 sentences, please identify the differences between design services and construction services that justify a government requirement to use QBS to purchase design services and allow the use of competitive bidding to purchase construction services.

B	Rice
C	McKean
E	Holland



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d) In 3 to 4 sentences, please explain why the government mandates QBS to procure architectural and engineering services while uses competitive bidding to procure the services of construction contractors.

- **Obvious Reason: Federal statutes mandate QBS for A/E services but not for construction work, but the question really is, why is this the law?**
- **Real Reason:**
 - **Federal statutes mandate QBS for A/E services because the quality of the A/E services have great impact on construction and life cycle costs, and QBS forces the Federal Government to focus first on quality factors before selecting the A/E to work toward a high quality design that will have lower construction and life cycle costs**
 - **Federal Statutes do not mandate QBS for Construction work because the actual construction must be accomplished in accordance with plans and specifications prepared during design, and the contractor who offers to complete the specified work for the least cost is the Government's best choice.**



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When a client hires an engineer to perform services, the client can do so based on the experience and qualifications of the engineers he considers (Qualification Based Selection, QBS), or the client can do so based on the fee these engineers charge for their services (Competitive Bidding).

Which of these methods does the engineering profession support for the procurement of design professional services in the public and private sectors? In 2 or 3 sentences, explain why the profession has adopted this position.

- 1. What does QBS stand for and whose interest does QBS protect?**
- 2. With QBS, who determines what defines the “most qualified” engineer during the selection process?**



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Discussion Question #6

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

- 1. (a) You are the owner who needs to hire an engineering company to design your project. Engineer A will design your project for 6% of construction cost, and Engineer B will design your project for 8% of construction cost. How will these fee factors affect your decision?**



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Discussion Question #6

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

- 1. (b) You are the owner who needs to hire an engineering company to design your project. Engineer X has never completed a similar project and Engineer Z has successfully completed several similar projects. How will these experience factors affect your decision?**



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Discussion Question #6

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

- 1. (c) You are the owner who needs to hire an engineering company to design your project. Engineer M has never completed a similar project and requests a fee of 6% of construction cost. Engineer P has successfully completed several similar projects and requests a fee of 8% of construction costs. How will you balance the fee and experience factors in making your decision?**



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Discussion Question #6

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- 2. How does an engineer's experience with a type of project affect construction and life cycle costs for the project?**



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- 2. How does an engineer's experience with a type of project affect construction and life cycle costs for the project?**
- 3. If Design costs 6% to 8% of construction cost, and life cycle costs (maintenance and personnel) are 3 to 4 times construction cost, how does an owner decide which engineer's design proposal will be least expensive? Note: At the extreme, Life Cycle Costs can be as high as 50 times construction costs. See <https://www.wbdg.org/resources/life-cycle-cost-analysis-lcca>**

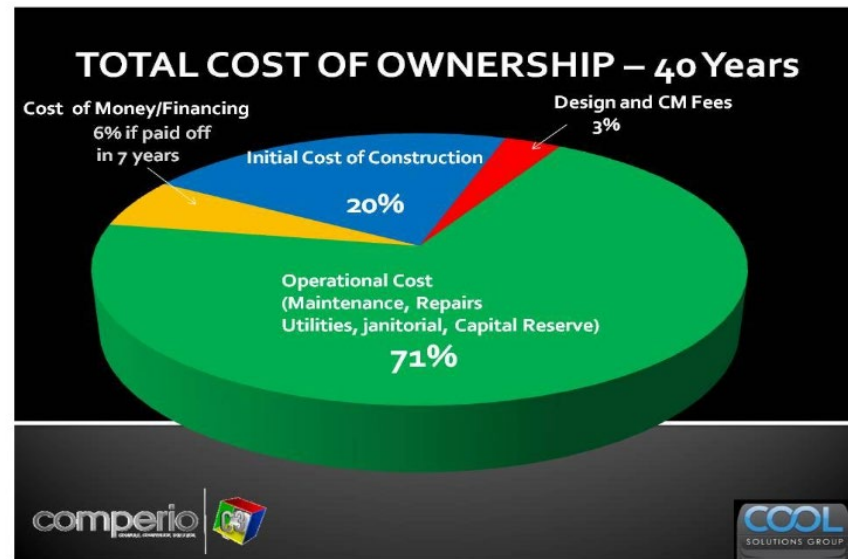


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Discussion Question #6

Design & CM: 15%
Construction: 100%
Life Cycle: 385%

COST SPECTRUM



<http://www.buildersassociation.com/docs/Education/Estimating%20Academy/Mark%20Gardner%20Total%20Cost%20of%20Ownership.pdf>



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Discussion Question #6

**Consider a \$3,000,000 Project Assuming
Engineers A and B designs
cost the same to build and operate**

Function	Engineer A	Engineer B	Difference
Design Fee	6%; \$180,000	8%; \$240,000	\$60,000 or 33%
Construction Cost	\$3,000,000 = \$3,180,000	\$3,000,000 = \$3,240,000	\$60,000, or 2%
Life Cycle Cost	\$9,000,000=\$12,180,000	\$9,000,000 = \$12,240,000	\$60,000 or 0.5%



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Discussion Question #6

What if Engineer B's Design Reduces Construction Cost by 3%?

Function	Engineer A	Engineer B	Difference
Design Fee	6%; \$180,000	8%; \$240,000	\$60,000 or 33%
Construction Cost	\$3,000,000 = \$3,180,000	\$2,910,000 = \$3,150,000	\$-30,000, or -0.9%
Life Cycle Cost	\$9,000,000 = \$12,180,000	\$9,000,000 = \$12,150,000	\$-30,000 or -0.24%



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Discussion Question #6

**What if Engineer B's Design
Reduces Life Cycle Cost by 3%?**

Function	Engineer A	Engineer B	Difference
Design Fee	6%; \$180,000	8%; \$240,000	\$60,000 or 33%
Construction Cost	\$3,000,000 = \$3,180,000	\$2,910,000 = \$3,150,000	\$-30,000, or -0.9%
Life Cycle Cost	\$9,000,000 = \$12,180,000	\$8,730,000 = \$11,880,000	\$-300,000 or -2.4%



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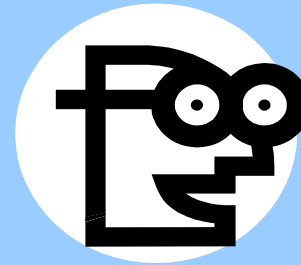
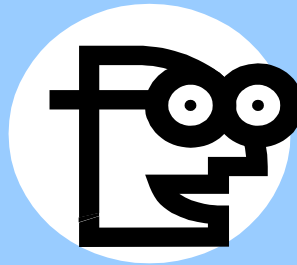
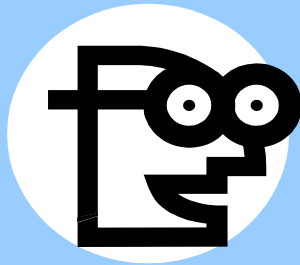
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Discussion Question #6

- **QBS protects the financial interests of the owner by allowing the owner to focus first on the experience and qualifications of the potential designers before considering the design professionals' fees.**
- **Quality during design usually translates into lower construction and life cycle costs.**
- **The design cost is highly leveraged against construction and life cycle costs, which minimizes the significance of most if not all design fee differences.**
- **Therefore, engineers should emphasize during selection process how their clients saved money on their projects due to designs that reduced construction and life cycle costs.**



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It's QUESTION TIME !!