The Real World

"I can't wait to get out into the real world!"

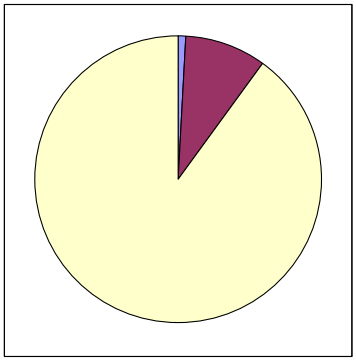
Red text is the response

Who uses engineering services? Public and private owners. Examples.

What do owners want? Low cost, quality, schedules, success, other things….

Define cost.

What are the costs of a project? Define these:



Design Cost Construction Cost Life Cycle Cost

What are their relative costs?

Design Cost:	$0.01 to $0.05
Construction Cost:	$0.10 to $0.50
Life Cycle Cost:	$1.00

Or just remember this ratio: 1:10:100

What affects the Life Cycle Cost? (Hint: Something that the owner can control)

Quality of design and construction.

What affects the quality of construction?

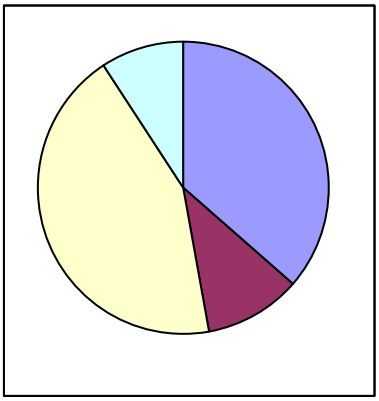
Personnel, equipment, management, of the contractor.

Clarity, accuracy, completeness of the construction documents (plans and specifications)
….and who is responsible for these….the engineer.

What affects the quality of the engineering?

Personnel, equipment, management ….and management is personnel!

How do you get quality personnel? $$$$



What is the cost of engineering?

Labor	$1.00
Benefits	$0.30
Overhead	$1.20
Profit	$0.25

When owners hire engineers, they have to consider these three things:

Quality Schedule Cost

…..the owner gets to choose no more than two…..and the engineer chooses the other(s).

Examples.

You want a quality project to be finished quickly….you got to pay for it.

You want a quality project to be done at low cost….you will wait for it.

You want a low cost project finished quickly….good luck and have a good lawyer

Play Real World (or the Engineering Reality Show and you are Ozzie)

Teams:

Consulting firm 1

Consulting firm 2

Owner: Private Client (developer of office buildings)

Owner: Construction Contractor

Owner: Manufacturing plant (you pick the type…widgets not allowed)

Owner: County Department of Public Works

Answer these questions and discuss with class:

Owners:

1. What are your priorities and why? (examples: profit, reputation, schedules, stability, meeting budgets, repeat business, more production, etc.)

2. In terms of engineering, what are your two preferences? (see above) Why? (relate these to your priorities)

3. As owner, what involvement do you anticipate you should have in the engineering designs (i.e. let them do their work and give me the results, set general scope and let

them take it from there, be involved with most technical decisions and add my input continuously)

Consulting Firms:

1. What is you business plan? (see list below)

Target client base:

Public works (roads, water, sewer, drainage)
Private development (residential)
Private development (commercial, industrial, institutional)
Specialty services (traffic studies, geotechnical, environmental, GIS and mapping, marine – coastal, air quality, etc.)

Personnel:

Low salary, few PEs, most technicians
Balanced salary, 20% PEs, 30% Design Engineers, 50% Technicians
High salary, 50% PEs, 20% Design Engineers, 20% scientists, 10% Technicians

Fees:

Low fees, high volume, low overhead
Competitive fees, medium growth, average overhead
High fees, low volume, high overhead

Qualifications:

High tech services
Very experienced staff
Quick response
National experience
Local experience
Environmental permitting efficiency
Knowledge of local conditions
Expert in codes
Full service
Specialist
Personal involvement of high level staff
Cheap engineering
Politically connected
Mafia ties

Questions:

How would you as an owner, hire an engineering firm?

Decide the level of quality that you need, find the firm that can provide it at a cost that you can afford. How do you determine quality?

If you are an owner of an engineering firm, how would you want your clients to hire you?

Pick your firm based on qualifications, pay a fair price, and get repeat business.

Has anybody thought of these things before? ….or what is done in the REAL WORLD?

Answer:

Consulting Engineering firms are selected and hired using many methods but only one offers the best chance of achieving both quality and value.

This method is endorsed by:

American Society of Civil Engineers
National Society of Professional Engineers
National Bar Association
American Institute of Architects
American Public Works Association
American Planning Association
American Council of Engineering Companies
Federal Government
State of Maryland
42 other states

Method:

Qualifications Based Selection – QBS

1. Evaluate qualifications of firms (experience, expertise of staff, references of past clients)

2. Rank the firms (up to 5)

3. Negotiate the scope (and fee) with top ranked firm.