CIVL 400 Quizzes (2013)

(Answers circled in orange)

UBC Department of Civil Engineering

CIVL 400: Construction Engineering and Management

Readiness Assessment Quiz 1: Project Management

Jan 9, 2013

1. An "organization" was defined in class as:
   a. the way that all of the parts of a building are decomposed into systems.
   b. The team of people working together to complete the project.
   c. A company involved in a construction project.
   d. Another name used to describe the overall project.

2. In process modeling techniques, a sequential relationship indicates:
   a. that one process is a decomposed into several sub-processes.
   b. that one process is a control for another process.
   c. That the output of one process is a required input of another process.
   d. That one processes is a mechanism used in another process.

3. For Construction Management, which of the following phrases is most comparable to the term "The design" as used in engineering design to describe the main representation?
   a. The plan
   b. The management
   c. A model
   d. A planning system

4. Of the following types of project objectives, which is the LEAST likely to result in tradeoff's among competing objectives?
   a. Cost
   b. Scope of work
   c. Quality
   d. Risk

5. A project manager holds a meeting to give the local community information about a project. Identify the item from the "Project Management on a page" framework that best describes this action:
   a. Human and organizational resources
   b. The participants and stakeholder context
   c. The environment objective
   d. The control process

6. A project manager creates a construction schedule. Identify the item from the "Project Management on a page" framework that best describes this action:
   a. The quality objective
   b. Human resources
   c. The time objective
   d. The control process – Plan, execute, control last

7. Horizontal specialization describes the situation in which:
   a. Different workers all work for different companies
   b. Different workers are very highly trained
   c. Different workers have different levels of coordination responsibilities
   d. Different workers carry out different types of jobs

8. The statement that best describes the role of Management is:
   a. The coordination of different companies
   b. The work performed within an organization
   c. The coordination of the work performed within an organization
   d. The work performed by the boss of an organization

9. Which of the following management activities fits best under the project resources section of the framework of project management discussed in class?
   a. Improving workplace safety
   b. Regulatory compliance according to general codes of practice
   c. Procurement of equipment
   d. Quality assurance

10. A project manager coordinates with a material testing consultant about when inspections will be completed on the project. Identify the item from the "Project Management on a page" framework that best describes this action:
   a. The risk objective
   b. The participants and stakeholder context
   c. The external influences context
   d. The quality objective

11. The PMBOK states that organizations perform work in the form of either operations or projects. For each of the following, do the statements refer to operations, projects, or both?

   The statement "The work is undertaken to create a unique product or service" applies to:
   a. Operations
   b. Projects
   c. Both projects and operations
   d. Neither projects nor operations.

12. The statement "The work is ongoing and repetitive" applies to:
   a. Operations
   b. Projects
   c. Both projects and operations
   d. Neither projects nor operations.

13. The statement "The work is planned, executed, and controlled" applies to:
   a. Operations
   b. Projects
   c. Both projects and operations
   d. Neither projects nor operations.

14. According to the PMBOK, which of the following statements is NOT a correct statement about project phases?
   a. Can be completed in any order, but must all be completed in order to complete the project.
   b. Is marked but the completion of one or more deliverables
   c. Are part of the generally sequential logic designed for the project
   d. Management control is established by defining a set of deliverables for the phase related to the primary phase deliverable.

15. According to the PMBOK, which of the following statements is NOT a correct statement about the reviews that are generally conducted at the end of project phases?
   a. generally review both key deliverables and project performance to date
   b. generally used to detect and correct errors cost effectively.
   c. often called phase exits, stage gates, or kill points.
   d. generally mean that the organization is committed to continue into the next phase

16. According to the PMBOK, which of the following statements is NOT a correct statement about process groups?
   a. Are a sequential set of discrete, one-time events (they occur in a specific order, with each activity completed before the next one begins).
   b. The central process groups are iterative.
   c. Include initiating processes and closing processes.
   d. Include planning, executing, and controlling processes.

Email response contradictio

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Readiness Assessment Quiz 2: Construction Projects

Jan 16, 2013

1) Which segment of the construction industry makes up the largest portion of the industry?
   a. Residential Construction
   b. Industrial Projects
   c. Non-Residential Buildings
   d. Infrastructures

2) The commissioning stage of the project is of high significance for which of the following type of construction project
   a. Residential projects
   b. Industrial projects
   c. Building projects (institutional and commercial)
   d. Heavy construction projects (infrastructure)

3) In the past several decades, how has the productivity of the construction industry changed with respect to the productivity of other manufacturing-based industries?
   a. Construction productivity has decreased while manufacturing productivity has increased steadily.
   b. Construction productivity has been slightly less that other manufacturing-based industries
   c. Both construction and manufacturing productivities have decreased
   d. Construction productivity has risen faster than manufacturing productivity.

4) Which of the following statements best describe the similarity between construction and professional service industries?
   a. They both produce products.
   b. They both involve the selling of expertise and effort.
   c. They both have little control over the working environment.
   d. In both, competition is heavily dominated by price.

5) For which of the following factors are the construction and manufacturing industries the most similar?
   a. basis for competition
   b. phases of the project lifecycle
   c. barriers for new companies to enter the market
   d. organizational characteristics

6) The ability of the stakeholders to influence the final characteristics of the project's product and the final cost of the project is highest in which phase:
   a. feasibility
   b. concept
   c. planning
   d. engineering

7) The level of effort is maximum (peak worker hours) at which of the stages?
   a. Feasibility study
   b. Commissioning
   c. Planning
   d. Engineering-Procurement-Construction

8) Different possibilities of project financing would be investigated in which stage of project?
   a. Planning
   b. Initial Design Phase
   c. Feasibility studies
   d. Procurement

9) True or False: Time spent on 'value added' activities in manufacturing is about the same as in construction.
   a. False
   b. True

10) Construction Plans and Specification will be produced at the end of which stage?
   a. Feasibility studies
   b. Design Development phase
   c. Construction documents phase
   d. Initial design phase

11) For which segment of the construction industry are costs the least influenced by labour costs?
   a. Heavy Civil Construction
   b. Commercial and institutional building
   c. Industrial Construction
   d. Residential

mainly large private companies

12) Which statement describes the unique characteristics of the construction industry in the most appropriate way?
   a. The construction industry is highly fragmented, competitive and stable.
   b. The construction industry is carried out by specialized small companies operating globally.
   c. The construction industry is highly fragmented, competitive, dynamic, unstable, and is carried out by specialized local companies.
   d. The construction industry is highly fragmented, competitive, and has a strong united voice.

13) Which information is transmitted to facility owners during the project closeout stage of the project?
   a. Design information from the design phase
   b. Bidding information from the procurement phase
   c. Organizational information from the planning phase
   d. Record documents from the construction phase

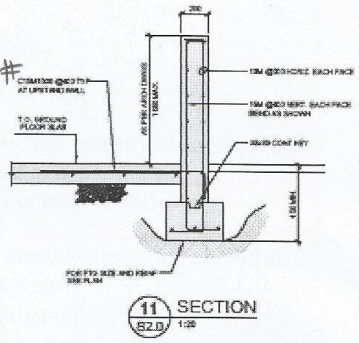
14) Which of the following would be the least useful ~~type of drawing~~ to get dimensions for height and depth:
   a. Elevations
   b. Sections
   c. Details
   d. Plans

15) In which design phase is the building program developed?
   a. Design development phase
   b. Construction documents phase
   c. Schematic design phase

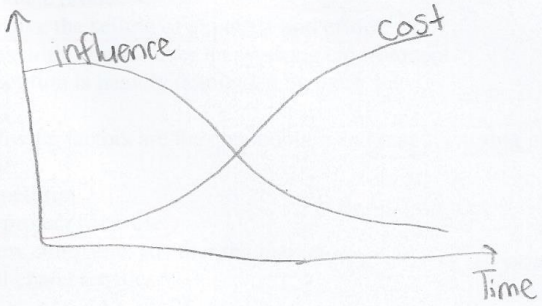
16) Which of the following project personnel would typically NOT be included in the 'field' side of the project organization?
   a. Superintendent
   b. Trade Forman
   c. Journeyman Carpenter
   d. Estimator

17) For the drawing detail shown on the right, which page number is referencing this detail?
   a. 11
   b. S2.0
   c. Not provided

drawing #



18) True or False: The Level of Influence diagram suggests that contractors have significantly less control over the project cost compared to designers.
   a. False
   b. True



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Readiness Assessment Quiz 3: Preliminary Estimating

Jan 28, 2013

1. Which type of estimate may be prepared to help the owner evaluate contractor's bids?
   a. Screening
   b. Preliminary
   c. Engineers
   d. Bid

2. Which type of estimate is prepared by a general contractor with input from subcontractors?
   a. Screening
   b. Engineers
   c. Preliminary
   d. Bid

3. Which type of estimate would be expected to have the greatest accuracy?
   a. Preliminary
   b. Engineer's
   c. Definitive
   d. Screening

4. For a recently completed facility, the cost was C_1 and the size or capacity was Q_1. The cost C_2 of a similar facility of size Q_2 can be estimated as:

$$C_2 = C_1\left(\frac{Q_2}{Q_1}\right)^m$$

   In this equation, what is the most likely value for m?
   a. M=0
   b. 1.0 < m
   c. m=1.0
   d. 0 < m < 1.0

5. During the life of a construction project:
   a. A series of cost estimates are produced at different times, for different purposes, by one or more of the project participants.
   b. Each participant produces a single cost estimate
   c. A series of cost estimates are produced, all created by the owner or their representative.
   d. A single, master estimate is produced that serves as the basis for all cost planning.

6. You are attempting to estimate the cost of a new facility to be constructed in 2015. You know that a similar facility was constructed in 2007 for a cost of C_1. You also know the following information

Construction Cost index for 2007:	210
Construction Cost index for 2015:	265
Average inflation rate from 2007-2015:	2.1%
Number of years 2007 to 2015:	8

Which of following would be the best estimate for the cost of the new facility C_2? (Hint: you may not require all of the available information)

either indexes or inflation NOT both

a. $C_2 = C_1\left(\frac{265}{210}\right)$

b. $C_2 = C_1\left(\frac{265}{210}\right)^{(1+0.021)}$

c. $C_2 = C_1\left(\frac{265}{210}\right)(1+0.021)^8$

d. $C_2 = C_1 \times 8 \times \left(\frac{265}{210}\right)$

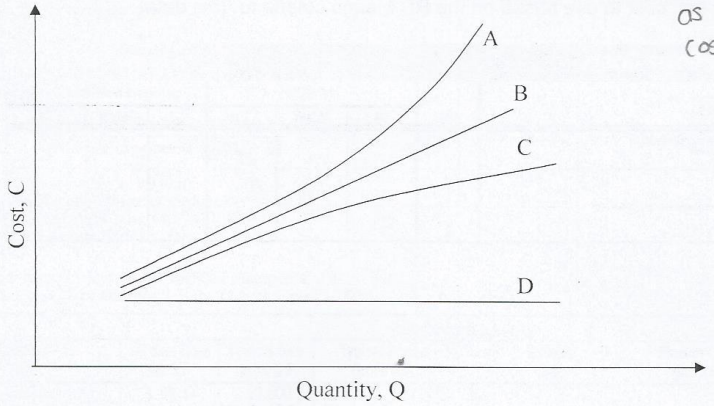
7. Cost estimating generally requires the use of historical unit cost data. Which of the following does NOT describe an appropriate use of historical cost records?
   a. May be obtained from a company's cost records of past projects.
   b. May be obtained from published cost data.
   c. Should be adjusted to reflect differences in time, location, etc.
   d. Should be used as recorded without modification.

8. Which of the following would NOT be included as a direct cost when completing a cost estimate for a building project?
   a. Labor
   b. Contingency
   c. Material
   d. Subcontracts

9. The RS Means Project Size Modifier is applied in Square Foot Cost Estimating to provide a factor that:
   a. Increases or decreases costs based on the perimeter of the building.
   b. Increases or decreases costs based on the height of the building.
   c. Converts costs to reflect the non-linear increase in cost with size. – cost capacity size modifier
   d. Converts costs for the typical size building to an adjusted cost for the particular project.

10. When using a cost-capacity factor approach for pre-bid estimation, which line on the following diagram best represents the relationship between the cost of the project, C, and the quantity of work, Q?:

as size increases, cost starts to go down



a. Line A
b. Line B
c. Line C
d. Line D

11. Which of the following is NOT a parameter used in calculating the cost of building construction using RS Means Model Costs:
a. Square feet of floor area
b. Exterior wall type
c. Linear feet of building perimeter
d. Type of substructure

12. What would be the most appropriate RS Means Project Size Modifier to apply when calculating a Square Foot Cost Estimate for a 50,000 square foot Low-Rise Dormitory:
a. 0.9
b. 0.94
c. 1.0
d. 2.0

higher M from size

13. In general, for buildings built to the same specifications in the same location, the larger building will have a lower square foot unit cost because of:
a. Decreasing contribution of the exterior walls and economies of scale.
b. Decreasing contribution of the exterior walls.
c. Economies of scale.
d. None of the above.

14. The following table provides Square Foot Costs from RS Means for College Classrooms and Administration Buildings. If your client asked you to provide a Square Foot Cost Estimate for a similar type of building that excluded site-work and equipment, which would be the most appropriate unit cost to use based on the RS Means criteria for this data:

K1010 | Square Foot Costs

	K1010 | S.F. Costs		UNIT	UNIT COSTS			% OF TOTAL		
				1/4	MEDIAN	3/4	1/4	MEDIAN	3/4
19	0010	COLLEGES Classrooms & Administration	S.F.	111	152	201			
	0020	Total project costs	C.F.	8.10	11.80	16.20			
	0500	Masonry	S.F.	8.15	15.35	18.85	5.65%	8.25%	10.50%
	2720	Plumbing		5.65	11.60	20.50	5.10%	6.60%	8.95%
	2900	Electrical		9.25	14.05	19.20	7.70%	9.65%	12%
	3100	Total: Mechanical & Electrical		37	51.50	61.50	24%	28%	31.50%

a. $152/SF
b. $201/SF
c. $111/SF
d. $11.80/CF

The following three questions will be based on applying the Model Estimating technique to the construction of a new 2-story College Classroom to be built in 2014 in Vancouver, BC using the RS Means Model Cost data provided:

- The perimeter of the building is 500 LF.
- The story height is 11'.
- The building uses stucco on concrete block with a steel frame for the exterior wall type.
- The building does not have a basement.
- Each floor of the ~~apartment~~ classroom building is 10,000 S.F.

15. The most appropriate base unit cost from the RS Means Model Cost data is:
a. $142.30
b. $168.75
c. $160.80
d. $163.45

16. The unit cost selected in Question 15 will need to be adjusted to account for:
a. Differences in Canadian currency
b. Differences in time
c. Differences in time and Canadian currency
d. Differences in time and location

17. The unit cost selected in Question 15 will need to be adjusted to account for:
a. The building perimeter
b. The building perimeter and the story height
c. The story height
d. None of the above

RK1010-050 Square Foot Project Size Modifier

One factor that affects the S.F. cost of a particular building is the size. In general, for buildings built to the same specifications in the same locality, the larger building will have the lower S.F. cost. This is due mainly to the decreasing contribution of the exterior walls plus the economy of scale usually achievable in larger buildings. The Area Conversion Scale shown below will give a factor to convert costs for the typical size building to an adjusted cost for the particular project.

Example: Determine the cost per S.F. for a 100,000 S.F. mid-rise apartment building.

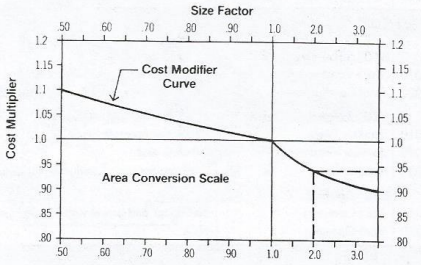
$$\frac{\text{Proposed building area} = 100{,}000 \text{ S.F.}}{\text{Typical size from below} = 50{,}000 \text{ S.F.}} = 2.00$$

Enter Area Conversion scale at 2.0, intersect curve, read horizontally the appropriate cost multiplier of .94. Size adjusted cost becomes .94 x $107.00 = $101.00 based on national average costs.

Note: For Size Factors less than .50, the Cost Multiplier is 1.1
For Size Factors greater than 3.5, the Cost Multiplier is .90

The Square Foot Base Size lists the median costs, most typical project size in our accumulated data, and the range in size of the projects.

The Size Factor for your project is determined by dividing your project area in S.F. by the typical project size for the particular Building Type. With this factor, enter the Area Conversion Scale at the appropriate Size Factor and determine the appropriate cost multiplier for your building size.



Square Foot Base Size							
Building Type	Median Cost per S.F.	Typical Size Gross S.F.	Typical Range Gross S.F.	Building Type	Median Cost per S.F.	Typical Size Gross S.F.	Typical Range Gross S.F.
Apartments, Low-Rise	$ 84.50	21,000	9,700 - 37,200	Jails	$ 257.00	40,000	5,500 - 145,000
Apartments, Mid-Rise	107.00	50,000	32,000 - 100,000	Libraries	161.00	12,000	7,000 - 31,000
Apartments, High-Rise	116.00	145,000	95,000 - 600,000	Living, Assisted	137.00	32,300	23,500 - 50,300
Auditoriums	141.00	25,000	7,600 - 39,000	Medical Clinics	146.00	7,200	4,200 - 15,700
Auto Sales	105.00	20,000	10,800 - 28,600	Medical Offices	138.00	6,000	4,000 - 15,000
Banks	189.00	4,200	2,500 - 7,500	Motels	102.00	40,000	15,800 - 120,000
Churches	130.00	17,000	2,000 - 42,000	Nursing Homes	142.00	23,000	15,000 - 37,000
Clubs, Country	132.00	6,500	4,500 - 15,000	Offices, Low-Rise	120.00	20,000	5,000 - 80,000
Clubs, Social	126.00	10,000	6,000 - 13,500	Offices, Mid-Rise	119.00	120,000	20,000 - 300,000
Clubs, YMCA	143.00	28,300	12,800 - 39,400	Offices, High-Rise	152.00	260,000	120,000 - 800,000
Colleges (Class)	152.00	50,000	15,000 - 150,000	Police Stations	190.00	10,500	4,000 - 19,000
Colleges (Science Lab)	242.00	45,600	16,600 - 80,000	Post Offices	141.00	12,400	6,800 - 30,000
College (Student Union)	179.00	33,400	16,000 - 85,000	Power Plants	1000.00	7,500	1,000 - 20,000
Community Center	134.00	9,400	5,300 - 16,700	Religious Education	120.00	9,000	6,000 - 12,000
Courthouses	180.00	32,400	17,800 - 106,000	Research	198.00	19,000	6,300 - 45,000
Dept. Stores	78.50	90,000	44,000 - 122,000	Restaurants	172.00	4,400	2,800 - 6,000
Dormitories, Low-Rise	143.00	25,000	10,000 - 95,000	Retail Stores	84.00	7,200	4,000 - 17,600
Dormitories, Mid-Rise	176.00	85,000	20,000 - 200,000	Schools, Elementary	125.00	41,000	24,500 - 55,000
Factories	76.50	26,400	12,900 - 50,000	Schools, Jr. High	129.00	92,000	52,000 - 119,000
Fire Stations	139.00	5,800	4,000 - 8,700	Schools, Sr. High	133.00	101,000	50,500 - 175,000
Fraternity Houses	131.00	12,500	8,200 - 14,800	Schools, Vocational	128.00	37,000	20,500 - 82,000
Funeral Homes	146.00	10,000	4,000 - 20,000	Sports Arenas	103.00	15,000	5,000 - 40,000
Garages, Commercial	93.50	9,300	5,000 - 13,600	Supermarkets	83.00	44,000	12,000 - 60,000
Garages, Municipal	119.00	8,300	4,500 - 12,600	Swimming Pools	194.00	20,000	10,000 - 32,000
Garages, Parking	50.50	163,000	76,400 - 225,300	Telephone Exchange	225.00	4,500	1,200 - 10,600
Gymnasiums	129.00	19,200	11,600 - 41,000	Theaters	120.00	10,500	8,800 - 17,500
Hospitals	228.00	55,000	27,200 - 125,000	Town Halls	137.00	10,800	4,800 - 23,400
House (Elderly)	115.00	37,000	21,000 - 66,000	Warehouses	60.00	25,000	8,000 - 72,000
Housing (Public)	106.00	36,000	14,400 - 74,400	Warehouse & Office	66.00	25,000	8,000 - 72,000
Ice Rinks	153.00	29,000	27,200 - 33,600				

Model costs calculated for a 2 story building with 12' story height and 50,000 square feet of floor area

College, Classroom, 2-3 Story

				Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE							
1010	Standard Foundations	Poured concrete; strip and spread footings		S.F. Ground	1.04	.52	3.7%
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base		S.F. Slab	4.10	2.05	
2010	Basement Excavation	Site preparation for slab and trench for foundation wall and footing		S.F. Ground	.22	.11	
2020	Basement Walls	4' Foundation wall		L.F. Wall	60	1.23	
B. SHELL							
	B10 Superstructure						
1010	Floor Construction	Open web steel joists, slab form, concrete		S.F. Floor	13.56	6.78	10.0%
1020	Roof Construction	Metal deck on open web steel joists, columns		S.F. Roof	7.76	3.88	
	B20 Exterior Enclosure						
2010	Exterior Walls	Decorative concrete block	*65% of wall*	S.F. Wall	12.57	2.47	6.1%
2020	Exterior Windows	Window wall	*35% of wall*	Each	33	3.52	
2030	Exterior Doors	Double glass and aluminum with transom		Each	3825	.46	
	B30 Roofing						
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite insulation		S.F. Roof	4.40	2.20	2.1%
3020	Roof Openings	N/A		–	–	–	
C. INTERIORS							
1010	Partitions	Concrete block	*20 S.F. Floor/L.F. Partition*	S.F. Partition	11.86	5.93	26.1%
1020	Interior Doors	Single leaf hollow metal	*200 S.F. Floor/Door*	Each	800	4.01	
1030	Fittings	Chalkboards, counters, cabinets		S.F. Floor	3.88	3.88	
2010	Stair Construction	Concrete filled metal pan		Flight	11,725	2.35	
3010	Wall Finishes	95% paint, 5% ceramic tile		S.F. Surface	6.30	3.15	
3020	Floor Finishes	70% vinyl composition tile, 25% carpet, 5% ceramic tile		S.F. Floor	4.16	4.16	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars		S.F. Ceiling	4.28	4.28	
D. SERVICES							
	D10 Conveying						
1010	Elevators & Lifts	Two hydraulic passenger elevators		Each	61,500	2.46	2.3%
1020	Escalators & Moving Walks	N/A		–	–	–	
	D20 Plumbing						
2010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	*1 Fixture/455 S.F. Floor*	Each	5100	11.21	12.3%
2020	Domestic Water Distribution	Oil fired hot water heater		S.F. Floor	1.25	1.25	
2040	Rain Water Drainage	Roof drains		S.F. Roof	1.20	.60	
	D30 HVAC						
3010	Energy Supply	N/A		–	–	–	16.2%
3020	Heat Generating Systems	Included in D3050		–	–	–	
3030	Cooling Generating Systems	N/A		–	–	–	
3050	Terminal & Package Units	Multizone unit, gas heating, electric cooling		S.F. Floor	17.25	17.25	
3090	Other HVAC Sys. & Equipment	N/A		–	–	–	
	D40 Fire Protection						
4010	Sprinklers	Sprinklers, light hazard		S.F. Floor	1.77	1.77	1.7%
4020	Standpipes	N/A		–	–	–	
	D50 Electrical						
5010	Electrical Service/Distribution	2000 ampere service, panel board and feeders		S.F. Floor	3.59	3.59	19.6%
5020	Lighting & Branch Wiring	Fluorescent fixtures, receptacles, switches, A.C. and misc. power		S.F. Floor	10.56	10.56	
5030	Communications & Security	Alarm systems, internet wiring, communications systems and emergency lighting		S.F. Floor	6.17	6.17	
5090	Other Electrical Systems	Emergency generator, 100KW		S.F. Floor	.55	.55	
E. EQUIPMENT & FURNISHINGS							
1010	Commercial Equipment	N/A		–	–	–	0.0%
1020	Institutional Equipment	N/A		–	–	–	
1030	Vehicular Equipment	N/A		–	–	–	
1090	Other Equipment	N/A		–	–	–	
F. SPECIAL CONSTRUCTION							
1020	Integrated Construction	N/A		–	–	–	0.0%
1040	Special Facilities	N/A		–	–	–	
G. BUILDING SITEWORK		N/A					
					Sub-Total	106.39	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)				25%	26.60	
	ARCHITECT FEES				7%	9.31	
					Total Building Cost	**142.30**	

M.120 College, Classroom, 2-3 Story

Costs per square foot of floor area

Exterior Wall	S.F. Area	15000	20000	28000	38000	50000	65000	85000	100000	150000
	L.F. Perimeter	350	400	480	550	630	660	750	825	1035
Face Brick with Concrete Block Back-up	Steel Frame	178.70	168.75	160.20	153.65	149.20	144.75	141.90	140.55	137.80
	Bearing Walls	178.30	167.35	157.95	150.60	145.60	140.45	137.20	135.70	132.50
Decorative Concrete Block	Steel Frame	172.60	163.45	155.70	149.90	145.90	142.10	139.60	138.40	136.00
	Bearing Walls	172.15	162.10	153.45	146.85	142.30	137.75	134.85	133.55	130.65
Stucco on Concrete Block	Steel Frame	169.85	160.80	153.15	147.35	143.45	139.70	137.25	136.05	133.70
	Bearing Walls	171.55	161.55	153.00	146.45	141.95	137.50	134.65	133.30	130.50
Perimeter Adj., Add or Deduct	Per 100 L.F.	7.50	5.60	4.00	3.00	2.25	1.75	1.30	1.15	.80
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	1.85	1.60	1.35	1.15	1.00	.80	.70	.65	.60
For Basement, add $27.60 per square foot of basement area										

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from $94.05 to $221.05 per S.F.

Common additives

Description	Unit	$ Cost
Carrels Hardwood	Each	820 - 1050
Clock System		
20 Room	Each	14,500
50 Room	Each	35,300
Elevators, Hydraulic passenger, 2 stops		
1500# capacity	Each	50,100
2500# capacity	Each	52,300
3500# capacity	Each	56,000
Additional stop, add	Each	7775
Emergency Lighting, 25 watt, battery operated		
Lead battery	Each	259
Nickel cadmium	Each	765
Flagpoles, Complete		
Aluminum, 20' high	Each	1350
40' High	Each	3050
70' High	Each	9800
Fiberglass, 23' High		1650
39'-5" High	Each	3175
59' High	Each	7975

Description	Unit	$ Cost
Lockers, Steel, single tier, 60" or 72"	Opening	161 - 254
2 tier, 60" or 72" total	Opening	109 - 141
5 tier, box lockers	Opening	58 - 72
Locker bench, lam. maple top only	L.F.	19.70
Pedestals, steel pipe	Each	60
Seating		
Auditorium chair, all veneer	Each	195
Veneer back, padded seat	Each	235
Upholstered, spring seat	Each	236
Classroom, movable chair & desk	Set	65 - 120
Lecture hall, pedestal type	Each	181 - 545
Smoke Detectors		
Ceiling type	Each	164
Duct type	Each	430
Sound System		
Amplifier, 250 watts	Each	2025
Speaker, ceiling or wall	Each	166
Trumpet	Each	315
TV Antenna, Master system, 12 outlet	Outlet	272
30 outlet	Outlet	173
100 outlet	Outlet	165

Important: See the Reference Section for Location Factors

UBC Department of Civil Engineering

CIVL 400: Construction Engineering and Management

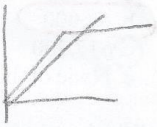
Readiness Assessment Quiz 4: Project Delivery

Feb 6, 2013

1. At the time of contract award, an owner would likely have the most price certainty for which of the following project delivery options?
   a. A guaranteed maximum price contract.
   b. A construction management contract.
   c. A lump sum contract
   d. A unit price contract.

2. Which of the following project delivery modes would be LEAST suitable for fast-tracked projects.
   a. Guaranteed maximum price
   b. Design-build
   c. Profession construction manager.
   d. Tradition design-bid-build with lump-sum bid

3. For a contract that uses cost reimbursement plus a fixed fee, with a guaranteed maximum price, which of the following best describes a situation in which the contractor's fee would be reduced?
   a. The quantity of steel is higher than expected.
   b. The total costs exceed the guaranteed maximum price.
   c. Bad weather causes poor productivity, resulting in higher labour costs.
   d. The contractor's crews negotiated higher wage rates.



4. The contractor can transfer the risk of higher-than-expected costs to the client in which of the following contract types.
   a. Lump sum
   b. Unit price
   c. Construction Management at risk contract
   d. Cost plus fee

5. For two types of project delivery, A and B, option A has a lower risk (of cost overruns) to the owner by transferring these risks to the contractor. Typically, how will the total price charged to the owner compare between options A and B?
   a. A will be higher than B.
   b. A will be less certain than B.
   c. A will be lower than B.
   d. A will be the same as B.

6. Suppose a project contains an excavation phase during the initial phases of the project. Which of the following situations will cost more to the OWNER of the project?
   a. The delivery mode is unit-price contract, and the amount of soil excavated is more than estimated
   b. The delivery mode is unit-price contract (based on volume), and the soil density was higher than estimated
   c. The delivery mode is lump-sum contract, and the amount of soil excavated is more than estimated
   d. The delivery mode is lump-sum contract, and the soil density was higher than estimated

7. Who takes the most financial risk associated with productivity issues in a unit cost contract?
   a. Construction Manager
   b. Project Engineer
   c. Owner
   d. Contactor

8. A contractor has entered into an agreement with a client to construct a building for cost plus a fee, with a guaranteed maximum price of $100,000. The actual final cost to the contractor to construct the building is $92,000. What is the profit to the contractor if the fee was set at 10% of actual costs?
   a. $9,200
   b. $8,000
   c. $17,200
   d. None of the above.

9. Which is the main disadvantage of the lowest-price competitive bidding process?
   a. The design documents are generally completed prior to bidding.
   b. The competition nature of bidding cause bidders to offer lower prices.
   c. There is always opportunity for further negotiation and dispute for scope and price changes.
   d. The process assumes that all bidders are offering an equivalent service.

10. In a construction management delivery method, the major trade contractors will sign a contract with which of the following parties?
   a. Construction manager
   b. General contractor
   c. Owner
   d. None of the above

11. Which way of selecting project participants is most likely to be optimal for the construction of the main stadium for the Olympic Games?
   a. Lowest price competitive bid
   b. Prequalification process followed by lowest price competitive bid
   c. Competitive bid followed by negotiation to further reduce price
   d. Prequalification process followed by competitive bid based on several weighted criteria

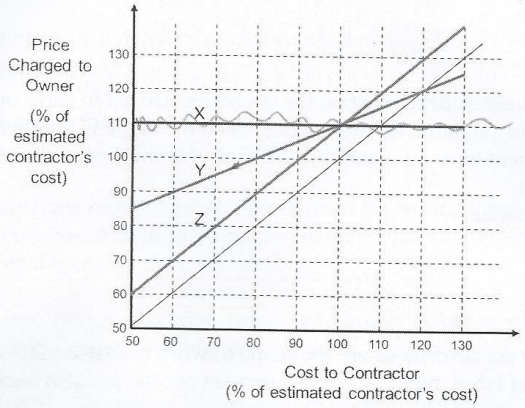
12. A contractor has entered into an agreement with a client to construct a building for cost plus a fee, with a guaranteed maximum price of $1,000,000. The actual final cost to the contractor to construct the building is $920,000. What is the profit to the contractor if the fee was set at a $50,000 fixed fee?.

a. $970,000
b. $50,000
c. $130,000
d. $80,000

50 000
+ 80 000
130 000

Questions 13 through 15:

The following graph shows the price charged to the owner vs. the cost to the contractor, both as a percentage of the contractor's original cost estimate, for three different types of contract.



13. Which line best represents the situation of a cost plus contract, with the contractor's fee (overhead and profit) set to be 10% of actual construction costs?

a. None of the above.
b. Line X.
c. Line Y.
d. Line Z.

14. Which line best represents the situation of a lump sum contract, where the initial price was set to be 10% higher than the contractor's initial estimated cost; with a cost sharing arrangements such that any costs over or under the estimated costs are split 50/50 between owner and contactor.

a. None of the above.
b. Line X.
c. Line Y.
d. Line Z.

15. Which line best represents the situation of a unit price contract, where the actual quantities of material are exactly as initially estimated?

a. Line Z.
b. Line Y.
c. Line X.
d. None of the above.

Questions 16 through 20:

PCL is one of the largest contractors operating in western Canada. The quotes given in the following questions are from PCL's web site, describing some of the services that they offer. For each question, select the contract type or delivery method that best matches the quote from the web site.

http://www.pcl.com/Services-that-Deliver/Contract-Types/Pages/default.aspx

16. "A __ contract is suitable if the scope and schedule of the project are sufficiently defined to allow the contractor to fully estimate project costs."
    a. Guaranteed Maximum Price
    b. Unit Price
    c. Cost Plus
    d. Lump Sum

17. "The final price of the project is dependent on the quantities needed to carry out the work. In general, this contract is only suitable for projects in which the scope is reasonably well established, and the different types of items (but not their numbers) can be accurately identified in the contract documents."
    a. Guaranteed Maximum Price
    b. Unit Price
    c. Lump Sum
    d. Cost Plus

18. "These types of contracts are favored where the scope of work is indeterminate or highly uncertain, and the kinds of labor, material, and equipment needed are also uncertain."
    a. Lump Sum
    b. Cost Plus
    c. Unit Price
    d. General Contracting

19. "Under a __ contract, the client secures the services of a __ to work with the design team and, depending on the client's needs, with trade contractors and suppliers."
    a. General Contracting
    b. Public-Private Partnerships
    c. Design-Build
    d. Construction Management

20. "This innovative project delivery method transfers risk to those parties that best understand and manage risk: financiers, developers, construction contractors, consultants, operators, suppliers, service providers, and concessionaires. The resulting consortium acts as cohesive team to achieve the client's goals and objectives for the project."
    a. General Contracting
    b. Construction Management
    c. Design-Build
    d. Public-Private Partnerships