

A PQSL Talk on 专业资格试前系统性进修讲座
Pre-Contract Cost Planning and Control 施工合约前的成本计划及控制
by Mr. K C Tang 邓琪祥先生主讲, FHKIS, FRICS, RPS(QS), AVS
Director of K C Tang Consultants Ltd. 邓琪祥顾问有限公司董事
on Saturday 12/4/2008 (2:00 pm - 6:00 pm) at SLC, HKIS

1. Overview 总纲
 - (a) Preparing Cost Estimates 编制估算概算
 - (b) Preparing Cash Flow Tables 编制资金流量表
 - (c) Attending Design Meetings 参与设计会议
 - (d) Monitoring the Design 设计监控
 - (e) Adjusting the Cost Estimates and Reconciling 估算概算调整及检讨
 - (f) Comparing alternatives 替代方案的比较
 - (g) Value engineering 价值工程
 - (h) Life cycle costing 生命周期成本

2. Need for Pre-construction Estimates 为何需要概算
 - (a) Knowing the costs for investment decisions 知道成本造价以作投资决定
 - Calculating land bid price 计算买地投标价
 - Calculating acceptable rental 计算可接受的租金
 - Evaluating the feasibility of the investment 评估投资的可行性
 - (b) Establishing a project (development) budget 确定发展项目的投资预算
 - (c) Formulating a design brief which defines the scope and standard of the project 制订设计任务书，说明发展项目的范围及标准
 - (d) Obtaining funding 获取拨款
 - (e) Borrowing money from the bank 向银行贷款
 - (f) Monitoring the design development to control the costs within budget 监控设计的深化以控制不超出投资预算
 - (g) Estimating fees 估算顾问费

3. Characteristics of Quantity Surveying in Hong Kong 香港工料测量的特色
 - (a) Full services from inception of project to completion of construction 由项目构思到建造完成的全过程造价咨询服务
 - (b) Now extending to post completion maintenance until redevelopment 现在申延到建造後的维修直至重建
 - (c) Dynamic management with constant review and updating 不断检讨及更新的动态管理

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4. Best Time to Plan and Control the Costs 造价控制的最佳时机
- (a) As early as possible during the development process 在项目发展阶段中越早越好
 - (b) Better chances to make design changes to find a better solution 较有机会修改设计取得更好的方案
 - (c) To reduce abortive design costs 减少设计返工
5. Different names of pre-construction cost estimates 概算的不同名称
- (a) Preliminary Indication of Costs 初步估算指标
 - (b) Preliminary Cost Estimates 概算
 - (c) Elemental Cost Estimate 功能分部概算
 - (d) Rough Indication of Costs 大约估算
 - (e) Cost Plans 成本计划
 - (f) Cost Models (An American term) 成本概算及计划 (美式用词)
 - (g) Pre-tender Estimate 标底
6. Cost Estimate, Cost Plan and Budget 概算, 计划及投资预算
- (a) A Cost Estimate reflects the estimated costs of a current design 概算反映某个现有设计的估计造价
 - (b) A Cost Plan is a detailed cost framework for controlling future design 成本计划乃控制将来设计的详细造价框架
 - (c) A Budget is the maximum sum a Developer is willing and able to spend on a project 投资预算乃建设单位愿意及有能力投资于某项目的最大金额
 - (d) A Cost Estimate for now, if satisfactory and approved, will become the Cost Plan for the future design 现行的概算(若满意及获批准) 便作为将来设计的成本计划
7. Cost and Price 成本与造价
- (a) "Cost" and "Price" often used interchangeably "成本" 与 "造价" 常常互通使用
 - (b) Between the two parties to a transaction, the price to the Seller/ Contractor is the cost to the Buyer/Employer 就某个交易而言, 卖方/承包方的造价即买方/发包方的成本
 - (c) For the same party, Cost + Profit = Price 就同一方而言, 成本+利润 = 造价

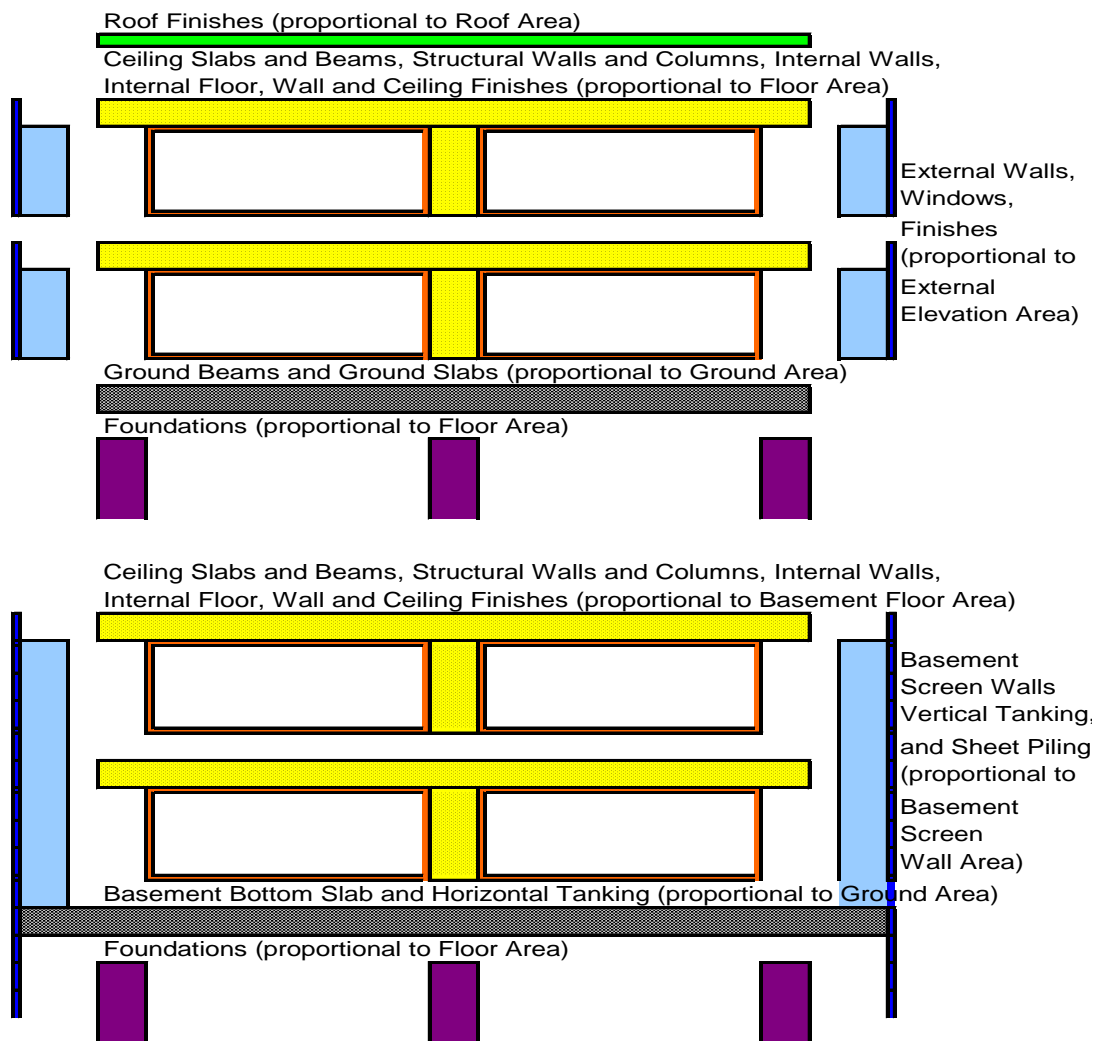
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8. Ways to Calculate the Cost Estimates 计算概算的方法
- (a) Estimates should be done using expedient methods, approximations and shortcuts to reduce estimating time and costs in order to afford more estimates
概算应以便捷的方法、框算和捷径以减少编制的时间及费用以便能多做概算
 - (b) Cost per floor area estimates 按楼面面积计算
 - (c) Cost estimates prepared by measuring the most significant cost parameters 按最有效应的造价参数计算
 - (d) Cost estimates prepared by measuring elemental quantities 按功能分部工程量计算
 - (e) Cost estimates prepared by measuring approximate quantities 按分项大约工程量计算
 - (f) Cost estimates prepared by pricing the bills of quantities ready for issuance or already issued for tendering 按工程量清单计算
9. Estimating approach 四字真言
- (a) From big to small 由大到小
 - (b) From rough to fine 从粗到细
 - (c) Focusing on the important 重点出击
 - (d) Making bold assumptions 大膽假設
 - (e) Verifying carefully 小心求証
 - (f) Comparing with the unlike 触类旁通
 - (g) Conducting self checking 自我复核
 - (h) Reconciling with the previous 瞻前顾后
 - (i) Empathizing with the Client 设身处地
10. Cost Parameters 造价参数
- (a) Floor Area 楼面面积
 - (b) Ground Area and Roof Area 地、屋面面积
 - (c) External Elevation Area 外立面面积
 - (d) External Area 室外面积
 - (e) Number of equipment 台数
 - (f) Refrigeration Tonnage 冷吨
 - (g) Other elemental quantities 其他功能分部工程量

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11. Cost Geometry 造价几何

- (a) Appreciating which cost portions should bear more direct proportions to each parameter 了解那部份的成本内容与那个造价参数有较直接的比例关系



- (b) Appreciating how changes in the size and shape of a building would change the cost proportions 了解楼宇的大小及形状的变化如何影响造价的分布

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12. Building up Composite Rates 组合单价的测算

- (a) Using composite rates to simplify measurement of details 用组合单价来简化细项的计算

Description	Qty	Unit	Constituent Rate	Composite Rate	Cost \$
R.C. Slabs and Beams	1,000	m ²		1,110	1,110,000
<i>Rate build-up</i>	<i>Qty Factors</i>				
Concrete	0.30	m ³	800	240	
Formwork	1.30	m ²	300	390	
Reinforcement (200 kg/m ³)	60.00	kg	8	480	

- (b) Allowance in quantities or rates for unmeasured items 数量或单价内要考虑不另行计算的内容

13. Source of Data 数据来源

- (a) Quantity Factors 含量
- Other Projects 其他工程
 - Analysis by sampling 抽样测算
- (b) Rates 单价
- Tender Prices 投标价
 - Final Account Prices 结算价
 - New Enquiries 询价
- (c) Cost Analysis of Other Projects 其他工程项目的造价分析

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14. Element 功能分部
- (a) An element is a part of a building which serves the same function for different buildings irrespective of the materials and design used, and which costs can easily be separated from others 功能分部乃楼宇内不论所用的材料或设计是什麼通常都是在不同的楼宇有同一功能的组成部份，而其计价可容易与其他部份分开的
- (b) Classifying the costs of a building (or other construction) into elements would facilitate: 把楼宇(或其他建设)的造价按功能分部分拆可利於：
- Comparison of the costs of different design options serving the same elemental function 达到同一功能的不同设计方案按功能分部的造价比较
 - Comparison with costs of other projects by elements 按功能分部与其他发展项目的造价比较
 - Rationalizing the budget allocation between different elements for better use 把投资按不同功能分部更合理地分配使用
 - Quicker estimating based on elemental quantities which are easier to measure 使用较易计算的功能分部数量加快估算
 - Analysis of data for different projects on the same basis and classification 以同一的基准及分类分析不同项目的数据
- (c) Different QS practices and ArchSD have different elemental classifications 不同的测量师事务所及建筑署有不同的功能分部分类方法
15. Element groups (example) 功能分部裙组(例子)
- (a) Builder's Works / Structure and Fabric 楼房土建 / 结构及框架
- (b) Finishes and Fittings 楼房装饰
- (c) Building Services 楼房机电安装
- (d) Site and External Works 前期及外围工程
- (e) Profits and Attendance on Sub-Contractors and Suppliers 分包管理配合费
- (f) Preliminaries 开办经营费
- (g) Design Contingencies 设计深化增项预留费
- (h) Construction Contingencies 施工不可预见费
- (i) Developer's Soft Costs 建设单位其他费用

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16. Builder's Works / Structure and Fabric 楼房土建 / 结构及框架
- (a) Foundation piling 基桩
 - (b) Foundations 基础
 - (c) Basement bottom and sides 地下室底板及外牆
 - (d) Structure 结构
 - (e) External Elevations (External Walls, External Wall Finishes, Windows, Curtain Walls) 外立面(外墙、外饰面、窗、幕墙)
 - (f) Internal Walls and Partitions 内间断
 - (g) Doors 门
 - (h) Roller Shutters and Fire Shutters 卷帘
 - (i) Roof Finishes 屋面
17. Finishes and Fittings 楼房装饰
- (a) Floor Finishes 楼地面
 - (b) Internal Wall Finishes 内墙面
 - (c) Ceiling Finishes 天棚
 - (d) Signs, Fixtures and Sundries 标志、固定装置、杂项
 - (e) Sanitary Fittings 洁具
 - (f) Furniture 家具
 - (g) Lighting Fittings 灯具

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18. Building Services 楼房机电安装
- (a) Underground Drainage 地下排水
 - (b) Above-ground Drainage 地上给排水
 - (c) Sewage Treatment 污水处理
 - (d) Pool Filtration Plant 泳池过滤系统
 - (e) Fountain 喷泉
 - (f) Gas 燃气
 - (g) Fire Services 消防
 - (h) Heating, Ventilating and Air-conditioning 暖通空调
 - (i) Electrical 电气
 - (j) Security, Telephone and Public Address 保安、电话及广播系统
 - (k) Lifts 电梯
 - (l) Escalators 电扶梯
 - (m) Gondola 擦窗机
 - (n) Turntable 旋转台
 - (o) Kitchen Equipment 厨房设备
 - (p) Special Equipment 特殊设备
19. Site and External Works 前期及外围工程
- (a) Demolition 拆卸工程
 - (b) Site Formation 场地平整
 - (c) Retaining Structures 挡土墙
 - (d) Dewatering 排水
 - (e) Utilities 机电主管道
 - (f) Boundary Walls 围墙
 - (g) Ancillary Structures 构筑物
 - (h) External Paving 路面
 - (i) Landscaping 园林绿化
20. Profits and Attendance on Sub-Contractors and Suppliers 分包管理配合费
21. Preliminaries 开办经营费

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22. Design Contingencies/Design Development Allowance 设计深化增项预留费
23. Construction Contingencies 施工不可预见费
24. Developer's Soft Costs 建设单位其它费用
- (a) Land Costs and Premium 地价及土地使用费
 - (b) Evacuation Costs 拆迁补偿费
 - (c) Costs of Capacity Upgrading, Diversion, Connection and Installation of Utilities
市政增容费、改道费、接驳费及初装费
 - (d) Work outside the Site Boundaries 红线外工程费
 - (e) Production and Process Equipment, Supermarket Stalls, Showcases 生产工艺
设备、超市货架、专柜
 - (f) Operating, Office and Back of House Furniture and Equipment 营业、办公及后
勤家具及设备
 - (g) Survey and Design Fees, Expenses and Site Staff Costs 勘察设计费、开支及驻
现场代表费
 - (h) Site Supervisory Costs 施工监理费
 - (i) Pre-Opening Expenses, Administration Costs and Working Capital 开幕前费用、
经营费用及流动资金
 - (j) Finance and Legal Expenses 财务和法律上的费用
25. Contents of A Cost Estimate 概算的内容
- (a) Grand Summary 大汇总
 - Total Cost of Each Section of the Project 建设项目每区域的总造价
 - Floor Area of Each Section 每区域的楼面面积
 - Unit Cost per Floor Area 每区域的楼面面积的单价
 - (b) Descriptions 编制说明
 - (c) Elemental Summary of each Section 每区域的功能分部汇总
 - Floor Area of the Section 该区域的楼面面积
 - Total Cost of Each Element of the Section 该区域的每功能分部总造价
 - Unit Cost per Floor Area 每功能分部的楼面面积单价
 - % Proportion of each Element 每功能分部所占百分比

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- (d) Detailed Build-up 具体项目
 - Arranged by Elements 按功能分部排列
 - Item Reference 编码
 - Descriptions 子目说明
 - Quantities rounded off to tens or thousands 拾位或百位整数的数量
 - Rates round off to two significant figures 两个有效数字的单价
 - Extension rounded off 万位整数的合价
 - Elemental Totals 功能分部总价
- (e) Possible additional information 可能的附加资料
 - Elemental Quantities 功能分部数量
 - Unit Costs per Elemental Quantities 功能分部单价

26. Descriptions of the Cost Estimates 估算编制说明

- (a) Project Name 项目名称
- (b) Project Location 项目地点
- (c) Scope of the Estimate 估算范围
- (d) Areas 面积
 - Construction Floor Area / Covered Floor Area 建筑面积/有盖楼面面积
 - Ground Area 地面面积
 - Site Area 地块面积
 - Lease Gross Floor Area 地契楼面面积
 - (Non-)Accountable GFA 可豁面/不豁面地契楼面面积
 - Bay Window Area 窗台面积
- (e) Basis of the Estimate 估算依据
 - Drawings used 依据的图纸
- (f) Price Levels 价格水平
 - Current Prices 现行价格
 - Fluctuations from Date of Preparing the Estimate to Tendering 由编制到招标的价格浮动
 - Fluctuations from Tendering to Completion of Construction 由招标到竣工的价格浮动
- (g) Outline Specification of Design and Materials 分部设计及用料大纲
- (h) Finishes Schedule 装饰表
- (i) Exclusions 不包项目

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27. Rate Build-up 单价组成
- (a) **Labour costs 人工费**
- Daily rates to include for daily basic wage, travelling and meal allowances, allowances for hand tools and personal accessories, allowances for holidays with pay, MPF contribution, year end bonus, incentive payments, levies and insurances if not priced separately, etc. 日工单价应包括基本日工资、交通及伙食津贴、工具及个人用品津贴、有薪假期、公积金、年终奖金、鼓励性奖金、未另行计算的政府徵费和保险、等等
 - Time to consider taking from stores, hoisting, lowering, placing, fixing and non-productive travelling and recess time, etc. 工时应考虑从仓取料、上料、安放、安装及非生产的交通及小息时间、等等
- (b) **Material costs 材料费**
- Rates to include for ex-factory costs, package, export transportation, transit insurance, customs clearance and duties, demurrage, off-site storage, local delivery, returning package, off-loading, etc. 单价应包括出厂价、包装、出口运输、运输保险、清关及关税、清关滞留、场外储存、当地运输、退还包装、卸货、等等
 - Quantities to consider basic quantities, breakage, damage, theft, wastage (cutting, conversion), unmeasured laps, bulkage, consolidation, shrinkage, etc. 数量应考虑基本用量、破损、损坏、失窃、损耗(切割剪裁、加工)、不另计的搭接、膨胀、收缩、等等
- (c) **Plant costs 机械费**
- Use of plant 机械使用费
 - Mobilization, relocation and demobilization, if not measured separately 机械进场、中间移位、退场运输费(若未有另项计算)
 - Fuels and consumables 燃料及耗料费
 - Maintenance and repair 维修保养费
 - Unavoidable idling time 不可避免的闲置费
- (d) **Site overheads 现场管理费**
- (e) **Head Office Overheads 公司管理费**
- (f) **Profit 利润**
- (g) **Tax if charged based on total price 按总价计取的税金**
- (h) **Rates build-up applicable to measured work as well as preliminaries 单价组成适用于实物工程量及开办经营费**

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28. Reasons for Cost Variances 造价差异原因

(a) Design 设计

- Functions 功能
- Materials and Construction 材料及实体
- Standard 档次

(b) Site Location 选址

- Transportation 交通
- Restrictions 限制

(c) Construction 施工

- Project Size 工程大少
- Extent of Mechanization 机械化程度
- Extent of Standardization 标准程度
- Extent of Repetition 重复程度
- Extent of Pre-fabrication 预制程度
- Volume of Bulk Purchasing 采购量
- Workmanship 工艺
- Weather 天气

(d) Economic Environment 经济环境

- Level of Market Competition 市场竞争程度
- Exchange Rates 汇率
- Time Differences 时间差

30. Indices for Adjusting for Time Differences 时间调整指数

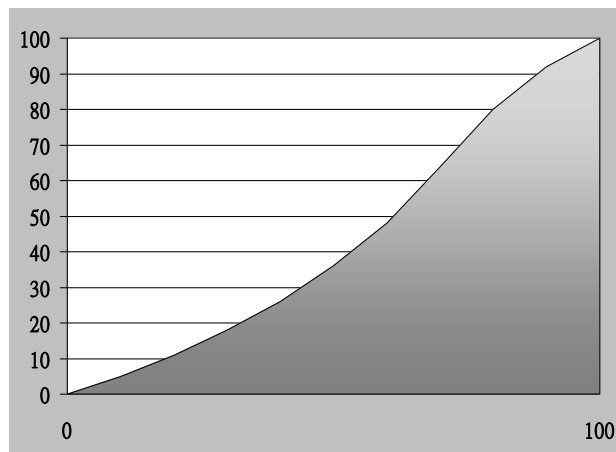
(a) Cost Indices 成本指数

(b) Tender Price Indices 造价指数

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on Saturday 12/4/2008 (2:00 pm - 6:00 pm) at SLC, HKIS

31. Preparing Cash Flow Tables 编制资金流量表

(a) Using S-curve 用 S 线图



- Divide the horizontal axis into parts equal to the number of months of construction 将水平轴按施工的月份数目分段
- For each month, interpolate from the curve the cumulative payment percentage on the vertical axis 利用曲线找出每个月在垂直轴相对的累计进度百分率
- Find the monthly payment percentages from the cumulative percentages 用累计进度百分率计出每月进度百分率
- Apply the monthly payment percentages to the total cost to obtain the monthly payment values 将每月进度百分率乘总造价得出每月进度款

(b) Using Bar Chart Programmes 用条形进度计划表

Section 分部	Month 月	1	2	3	4	5	6	7	19	Total 合计
Percentages 百分率										
Structure 结构		15%	20%	25%	20%	20%				100%
Finishes 装饰						20%	40%	40%		100%
Retention 保修金								50%	50%	100%
Values 造价										
	Total 合计									
Structure 结构	700	105	140	175	140	140	0	0	0	700
Finishes 装饰	250	0	0	0	0	50	100	100	0	250
Retention 保修金	50	0	0	0	0	0	0	25	25	50
	1,000	105	140	175	140	190	100	125	25	1,000

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- Following the bar chart programme, assign the monthly payment percentages for each activity bar 跟从条形进度计划表，对每条活动配以每月进度百分率
 - Apply the monthly payment percentages to the total cost of each activity bar to obtain the monthly payment values 将每月进度百分率乘该条活动的造价得出每月进度款
 - Ensure that the total of each activity bar is correct 确保每条活动的合计无误
- (c) Separating stage payments 要把分期付款及大型采购分列
- (d) Separating Retention 要把保修金分列
- (e) Watching out time lag between work carried out, payment certification and honouring of payment 注意施工、批款及付款的时间差

32. Reconciliation 概算变化的解释

- (a) Presented vertically 垂直列出
- | | | |
|-----------------------|---|----------|
| Original Estimate 原概算 | = | <> |
| Adjustment 1 调整 1 | = | <> |
| Adjustment 2 调整 2 | = | _____ <> |
| New Estimate 现概算 | = | _____ <> |

- (b) Presented side by side 并排表示

Elements 功能分部	Original Estimate 原概算 \$	New Estimate 现概算 \$	Increase (Decrease) 增(减) \$	Reasons 原因

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33. Pre-tender estimate 标底
- (a) Pricing the Bills of Quantities before formal issue of tender documents or before return of tenders 在发出招标文件前或在回标前利用工程量清单套取单价计价
 - (b) To check whether the cost so priced is within the previous estimate and the Budget 以检查得出的总价是否仍在前概算或投资预算之内
 - (c) Making design changes and issuing tender addendum to keep the costs within the Budget 作出设计修改并发出招标文件变更通知以便维持造价在投资预算之内
 - (d) For checking against tenders returned for reasonableness 用作评核回标价的合理性
34. Value engineering 价值工程
- (a) Not Necessarily Cost Reduction 不一定是减钱
 - (b) Increasing Value = Function / Cost Ratio 增加价值=效益/成本的比率
 - (c) Enhancing Value while 提升价值的同时
 - Reducing Cost 减低成本
 - Keeping Cost Unchanged 维持成本不变
 - Increasing Cost to a lesser extent 增加成本但幅度较细
 - (d) "Cost" can be non-financial "成本" 可以不是金钱上的
 - (e) Value Workshop Phases 价值工作坊的阶段
 - Information Phase 资讯收集阶段
 - Function Analysis Phase 效益分析阶段
 - Creative Phase 方案创造阶段
 - Evaluation Phase 方案评估阶段
 - Development Phase 择优深化阶段
 - Presentation Phase 推介阶段
35. Life cycle costing 生命周期成本
- (a) Life cycle costs / costs-in-use 生命周期成本
 - Capital Costs 建设费
 - Running Costs 日常使用费
 - Repair and Maintenance Costs 维修保养费
 - Removal Costs and Residual Value 拆除费及残余值
 - (b) Using discounted cash flow techniques 用贴现现金流方式计算
 - (c) Impact on use of natural resources is now also under the scope of consideration 对自然资源的影响现在亦纳入考虑范围