HKIS (QSD) CPD

Event Name : **Contractor's Pricing for Structural Elements**

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Date : **5th August 2014**

Time : **7:00pm – 8:30pm**

Venue : **Surveyors Learning Centre**

Contractor's Pricing for Structural Elements – Overview

1. There is no hard and fast rules to price.

2. The purpose of this talk is to cover the basic principles of building up cost and eventually pricing for structural elements.

3. The speaker will share his experience in pricing structural elements of concrete, formwork and reinforcement for submitting tenders of building projects.

4. **Indicative cost data will be provided in [$xxx] for reference. However, the speaker shall not guarantee and shall not be liable for the accuracy of the given data for any use.**

Building-up Cost of Structural Elements

1. Building-up the cost by experience and with reference to the quotations received from the sub-contractors, suppliers and plant hirers.

2. Reviewing the build-up cost (together with sub-contractors) with reference to the method statement and programme prepared by Project Manager.

3. Adding cost for complying with the special requirements of the tender (e.g. Special Preambles).

Factors to be Considered When Pricing

1. Requirements in the preliminaries (e.g. working hours)
2. Other Contract requirements (e.g. Special Preambles & Particular Specification)
3. Statutory requirements
4. Payment terms
5. Type of Contract (Lump sum with or w/o quantities)
6. Contract period (and actual construction period)
7. Amount of LD (and EOT clause)
8. Reputation of the Employer and Consultants
9. Mode of sub-contracting (for specialist works)
10. Location of the Site
11. Site and working conditions
12. Market condition
13. Contractor's resources, financial capability and workload
14. Contractor's pricing strategy
15. Any other relevant factors

3 Major elements to be covered in this talk:-

- Concrete
- Formwork
- Reinforcement

Pricing Concrete

Build-up Cost of Concrete

- #Labour Cost

  (Concretor; Labourer)
- Plant / Equipment Cost

  (*Concrete pump; *Tower crane; *Mobile crane; *Material hoist; *Concrete bucket; #Wheel barrel; #Concretor vibrator)
- Material Cost

  (Concrete; Waterproofing admixture; Wastage)
- *Testing of Concrete

  (Slump test; Concrete cube test; Hammer test; Core test)

*Normally priced in preliminaries

#Normally included in sub-contractor's quotation for placing concrete (labour only)

Considering Factors for Pricing Concrete

- Concreting volume per day
- Concreting method (by concrete pump, tower crane, mobile crane material hoist or mix of the above)
- Concreting of different concrete mixes on the same floor (may need to upgrade the lower grade concrete)
- Extent of box-out areas / late cast areas

Labour Strength and Cost for Concreting (by Concrete Pump)

	200m³/day	100m³/day	30m³/day	Wages
Skilul Concretor (Connecting concrete pump pipes; 1 day before concreting date)	1 No.	1 No.	N/A	[$~~1,800~~/day] $2,100
Skilful Concretor (Vibrator operator + Concretor)	5 No. + 3 No.	3 No. + 2 No.	1 No. + 1 No.	[* $~~1,800~~/day] $2,100
Semi-skilful Concretor (at concrete truck)	1 No.	1 No.	1 No.	[* $~~1,300~~/day] $1,500
Labourer (by miscellaneous works sub-contractor)	7 No.	4 No.	2 No.	[$900/day]
	10 No. Concretors + 7 No. Labourers	7 No. Concretors + 4 No. Labourers	3 No. Concretors + 2 No. Labourers	

*
- Place order at 3pm before concreting day
- Cancel order (after 7pm before concreting day) [Half payment]
  (arrived site on concreting day) [Full payment]
- Overtime (after 6pm) [$~~450~~/hour]
  $525
- Working at lunch hour/ tea time [$~~225~~/hour+lunch/ tea time]
  $262.5

Plant Hiring Cost of Concrete Pump

1. Concrete Pump Truck

- Concrete pump truck (21m – 25m; 28m; 30m – 32m; 36m; 38m; 42m - 43m; 48m; 56m) [$3,200/day (28m or below) - $5,000/day (36m; 38m) - $11,500/day (56m)]

- Operator [included by pump truck company]

- Fuel [included by pump truck company]

- Transportation [$800 - $1,500/round-trip]

- Cancellation charge (after 3pm before concreting day) [Half Payment]
  (after 12noon on concreting day) [Full payment]

Plant Hiring Cost of Concrete Pump

2. Concrete Pump Stationed on Site

- Concrete pump stationed on site [$45,000/month]
- Operator [$1,400/day]
- Fuel [to be provided by Contractor]
- Installation / dismantling [$6,000/time]
- Alteration of location [$3,000/time]
- Concrete pump fixed pipe [$800/m]

Material Cost of Concrete (20/20D – 60/20D)

- Concrete (200 slump for 60/20D; 75 or 100 slump for other mixes) [$725/m^3 - $1,200/m^3]
- Each 25 slump [$28/m^3]
- Dumpling concrete charge [$1,800/load]
- Part load charge (below 7m^3 - 8m^3) [$120/m^3]
- Waterproofing admixture [$115/m^3]
- Use of recycled aggregate [$200/m^3]
- Temporary control (25°C, 30°C, 32°C) [$120/m^3 (min. charge: $2,400) - $265/m^3 (min. charge: $5,300)]
- Overtime (after 7pm) and early start (before 8am) charge [$1,580/hour]
- Multiple drop charge [$100/additional discharge point]
- Cancellation of order charge (300m^3 or above during the day of delivery) [$50/m^3]
- Fluctuation [$35/m^3 every 6 months]
- Wastage

Pricing Formwork

Build-up Cost of Formwork

- #Labour Cost

  (Carpenter (Formwork); Rigger/metal formwork erector; General worker and labourer)
- Plant / Equipment Cost

  (*Tower crane; *Mobile crane; *Derrick; #Sawing machine)
- #Material Cost

  (Plywood & timber, nails & bolts; Aluminium formwork; Steel formwork; Plastic formwork; Falsework)
- #Design and Structural Calculation for Formwork, Falsework & Working Platform

*Normally priced in preliminaries

#Normally included in sub-contractor's quotation for erecting formwork

Considering Factors For Pricing Formwork

- Materials of formwork
- Days of concreting cycle
- Storey height
- Site hoisting facilities (such as tower cranes, mobile cranes & derricks, etc.)
- Type of buildings (such as factories, office buildings, residential buildings & institutional buildings, etc.)
- Extent of box-out areas / late cast areas
- Special falsework for allowing access / working space

Type of Formwork (Classified According to Materials of Formwork)

- Traditional timber formwork (for non-typical floors; low rise buildings)
- Aluminium formwork (for high rise typical floors)
- Steel formwork (for left-in formwork adjoining existing buildings; high level (say above 7m) walls)
- Plastic formwork (for circular columns)

Traditional Timber Formwork

1. Erecting Formwork (including erecting falsework) (by workdone)
   - (For typical flats under 4-5 days cycle) [$~~3,300~~/day - $~~4,000~~/day]
     $4,000 $4,500
   - (For non-typical floors) [$2,500/day - $~~2,700~~/day]
     $2,800
2. Erecting formwork (daywork) [$~~1,500~~/day - $2,000/day]
   $1,800
3. Uplifting formwork & falsework (by workdone) [$2,000/day];
   (daywork) [$1,300/day]
4. Removal of formwork (by workdone) [$2,100/day]
   (daywork) [$1,400/day]
5. Erecting falsework [$1,500/day]
6. Removal of nails and bolts [$1,200/day & $1,400/day]
7. Miscellaneous works (including making good step joints and concrete surfaces, etc.) [$900/day - $1,000/day]

Aluminium Formwork

1. Erecting, uplifting & removal of aluminium formwork (including erecting falsework)
   - (by workdone) [$2,200/day - $2,300/day]
   - (daywork) [$~~1,500~~/day]

     $1,800

2. Miscellaneous works (including making good step joints and concrete surfaces, etc.) [$900/day - $1,000/day]

Pricing Reinforcement

Build-up Cost of Reinforcement

- Labour Cost
  - Fixing Reinforcement (#Bar bender & fixer; #Ganger)
  - #Internal Transportation
- Plant / Equipment Cost

  (*Tower crane; *Mobile crane; *Derrick; #Bar cutting & bending machine)
- Material Cost

  (Steel bar reinforcement; Coupler; Mesh reinforcement; #Steel wire; #Plastic chair and concrete block (spacer))
- *Testing of Reinforcement

  (CS2: 1995/ BS4449 (Grade 460): Tensile test; Bend test; Rebend test)

  (CS2: 2012 (Grade 500B) – Class 2: Tensile test; Rebend test; Mass per metre; Surface geometry/ bond property; Chemical composition (N/A at the moment))

*Normally priced in preliminaries

#Normally included in sub-contractor's quotation for fixing reinforcement (labour only)

Considering Factors for Pricing Fixing Reinforcement

- On-site/off-site bar bending yard
- Location of on-site bar bending yard
- Site hoisting facilities (such as tower cranes, mobile cranes & derricks, etc.)
- Size of steel bar reinforcement
- Type of buildings (such as factories, office buildings, residential buildings & institutional buildings, etc.)
- Extent of box-out areas / late cast areas

Sub-contractor's Quotation for Fixing Reinforcement (Labour only)

Sub-contractor's Quotation [$3.5/kg - $4.5/kg] of Fixing Reinforcement (Labour only) included:-

- Skilful steel bender & fixer (after 1/5/2014) [*$1,710/day]
  (after 1/5/2015) [$1,930/day]
  (after 1/5/2016) [$2,150/day]

* • Cancel order (arrived site; no work due to adverse weather) [$150 travel allowance]
  (before 10am) [25% payment]
  (after 1:30pm) [50% payment]
  (after 3:30pm) [75% payment]

- Overtime (5:30pm – 9:30pm) [1 day payment]
  (public holiday and Sunday) [1.5 days payment]

Sub-contractor's Quotation for Fixing Reinforcement (Labour only)

Sub-contractor's Quotation [$3.5/kg - $4.5/kg] of Fixing Reinforcement (Labour only) included (Cont'd):-

- Semi-skilful steel bender & fixer [$1,200/day]
- Ganger [surcharge of $40/steel bender & fixer]
- Bar cutting & bending machine
- Steel wire
- Plastic chair & concrete block (spacer)
- Transportation of reinforcement from offsite bending yard to site (subject to agreement)
- Scrap of re-bars (subject to agreement)

Material Cost of Steel Bars Reinforcement (Y10, Y12, Y16, Y20, Y25, Y32 & Y40)

- Fixed length (12m) [CS2: 1995: $~~4,200~~/ton - $~~4,500~~/ton]
  $3,700 $4,000
  [CS2: 2012: $4,100/ton - $4,400/ton (from Oct 2014);
  +$400/ton (current stock)]
- Special length (10m, 13.7m & 15m) for Y25 / Y32 / Y40 [CS2: 1995: +$250/ton];
  [CS2: 2012: N/A]
- Delivery charge
  - (For 12m) [$~~135~~/ton (Yuen Long / Tuen Mun) - $~~190~~/ton (Hong Kong
    $150 $205
    Island; excluding the Peak, Mid-level & Southern District)]
  - (For 12.1m – 15m) [CS2: 1995: +$50/ton]; [CS2: 2012: N/A]
- Escort charge (for 15m) [$800/truck]
- Minimum order (min. load 12 ton and max. load 18 ton per truck)
- Additional unloading charge by tower crane [$50/ton]
- Surcharge for “BEAM-Plus” requirements
- Wastage
- Scrap of re-bars

Material Cost of Coupler

- Coupler (32m; 40mm) [$30/No.; $50/No.]
- Threading (32mm; 40mm) [$30/2No.; $40/2No.]
- Delivery charge [$1,500/round-trip]
- Wastage

Average Daily Wages of Workers Announced by Census and Statistics Department (as at ~~January~~ May 2014)

- Concrete [$~~1,498.5~~/day]

  $1,667.2

- Bar bender and fixer [$~~1,603.0~~/day]

  $1,685.9

- Carpenter (formwork) [$~~1,564.3~~/day]

  $1,672.4

- Rigger/metal formwork erector [$~~1,396.5~~/day]

  $1,480.0

- General worker and labourer [$~~746.3~~/day]

  $778.3

Average Wholesales Prices of Building Materials Announced by Census and Statistics Department (as at ~~January~~ May 2014)

- Concrete [No such item]

- Reinforcement (Y10-Y40) [$~~5,101~~/ton]

  $4,895

Contractor's Pricing for Structural Elements – Submitting Tender

1. Allocating the price to relevant preliminaries items

2. Mark-up

3. Tender price adjudication

Are you Capable to Price (Structural Elements)?

The following questions may help you to decide.

1. Do you have good sense on cost data?
2. Are you able to work out or at least to read method statement?
3. Are you able to work out or at least to read programme?
4. Do you have good sense to find out risk items in the tender documents?
5. Do you have basic knowledge of building technology?
6. Do you have basic knowledge of statutory requirements?
7. Do you have good relationship with your project team?
8. Do you have good relationship with sub-contractors and suppliers / plant hirers?
9. Have you updated yourself from working experience and learning?
10. Are you able and willing to work overtime or even overnight?

END

(QUESTIONS & ANSWERS)