

Annexure-D

Worked Out Example on Preparation of Retrofit Construction Preliminary Estimate

Building Type : Non-Residential Building

Building Category : Super Structure (8840 sft/per floor)

Type of structure : R. C. C. frame structure with 1: 1.5: 3 concrete (stone chips)

Location : Dhaka

Foundation : Shallow foundation, 6 storied

Sub-structure upto Ground Floor Information

Column Jacketing with Footing : 15 Nos

Column Jacketing without Footing : 15 Nos

Shear Wall with Footing : 4 Nos

Sub-structure for Steel bracing : 8 Nos

Super Structure Information

Column jacketing : 30 Nos

Beam Jacketing : 12 Nos

Shear Wall Insertion : 4 Nos

Steel Bracing Infill : 4 Nos

Steel Bracing out fill Beam Column Ext. : 2 Nos

Steel Bracing out fill Beam Ext. : 2 Nos

1. Assessment of existing building (A)

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
A	Assessment of building and investigation cost = 5% on "B+C"	LS	71,078,943.45	1	1	5%	3,553,947.17

Sub Total A = 3,553,947.17

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2. Retrofitting construction of building: sub-structure cost up to ground floor (B)

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
B1	Single foundation with column up to ground floor cost from project data sheet unit rate of column with footing_1	m	71,098.00	5.21	15.00	78.15	5,556,308.70
B2	Column jacketing up to ground floor cost from project data sheet unit rate of column without footing_2	m	47,029.00	5.21	15.00	78.15	3,675,316.35
B3	Footing with shear wall construction cost from project data sheet unit rate of footing with shear wall_3	sqm	57,223.00	17.6	4.00	70.40	4,028,499.20
B4	Sub structure of steel bracing insertion cost from project data sheet unit rate of sub-structure brace_4	sqm	38,386.00	7.25	8.00	58.00	2,226,388.00

Sub-Total: B =B1+B2+B3+B4 15,486,512.25

3. Retrofitting construction of building: super structure cost (C)

C1 Column jacketing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
a-1	1st. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	42,686.00	3.00	30	90.00	3,841,740.00
a-2	2nd. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	43,326.29	3.00	30	90.00	3,899,366.10
a-3	3rd. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	43,976.18	3.00	30	90.00	3,957,856.59
a-4	4th. floor column jacketing cost from project data sheet, column jacketing_4 column h=3m	m	44,635.83	3.00	30	90.00	4,017,224.44

NB: Unit rate of Column member of a floor = 1.015 x that of previous floor

Sub-Total:C1= 15,716,187.13

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C2 Beam jacketing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
b-1	Ground floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	49,502.00	4.00	12.00	48.00	2,376,096.00
b-2	1st. floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	50,244.53	4.00	12.00	48.00	2,411,737.44
b-3	2nd. floor beam jacketing cost from project data sheet, beam jacketing_6, 4 m	m	50,998.20	4.00	12.00	48.00	2,447,913.50
b-4	3rd. Floor Beam Jacketing cost from project data sheet, Beam Jacketing_6, 4 m	m	51,763.17	4.00	12.00	48.00	2,484,632.20
b-5	4th Floor Beam Jacketing cost from project data sheet, Beam Jacketing_6, 4 m	m	52,539.62	4.00	12.00	48.00	2,521,901.69

NB: Unit rate of Beam member of a floor = 1.015 x that of previous floor

Sub-Total:C2= 12,242,280.83

C3 Shear wall insertion

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
c-1	1st. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	22,667.00	10.35	4.00	41.40	938,413.80
c-2	2nd. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	23,007.01	10.35	4.00	41.40	952,490.01
c-3	3rd. floor shear wall cost from project data sheet, in fill shear wall_7, 10.35 sqm	sqm	23,352.11	10.35	4.00	41.40	966,777.36
c-4	4th. floor shear wall cost from project data sheet, shear wall_7, 10.35 sqm	sqm	23,702.39	10.35	4.00	41.40	981,279.02

NB: Unit rate of shear wall member of a floor = 1.015 x that of previous floor

Sub-Total:C3= 3,838,960.18

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C4 Steel bracing work

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
d-1	Ground floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	94,151.00	5.88	4.00	23.52	2,214,431.52
d-2	1st. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	95,563.27	5.88	4.00	23.52	2,247,647.99
d-3	2nd. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	96,996.71	5.88	4.00	23.52	2,281,362.71
d-4	3rd. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	98,451.66	5.88	4.00	23.52	2,315,583.15
d-5	4th. floor steel bracing insertion cost from project data sheet, in fill steel bracing_8, 5.88 sqm	sqm	99,928.44	5.88	4.00	23.52	2,350,316.90

NB: Unit rate of steel bracing member of a floor = 1.015 x that of previous floor

Sub-Total:C4= 11,409,342.28

C5 Steel bracing work with beam-column extension

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
e-1	Ground floor steel bracing insertion with beam-column extension cost from project data sheet, out fill shear wall, column+beam_9, 5.88 sqm	sqm	122,672.00	5.88	2.00	11.76	1,442,622.72
e-2	1st. Floor steel bracing insertion with beam-column extension cost from project data sheet, out fill shear wall, column+beam_9, 5.88 sqm	sqm	124,512.08	5.88	2.00	11.76	1,464,262.06
e-3	2nd. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beam_9, 5.88 sqm	sqm	126,379.76	5.88	2.00	11.76	1,486,225.99
e-4	3rd. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beam_9, 5.88 sqm	sqm	128,275.46	5.88	2.00	11.76	1,508,519.38

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e-5	4th. Floor steel bracing insertion with beam-column extension cost from project data sheet, Out fill Shear wall, Column+Beaml_9, 5.88 sqm	sqm	130,199.59	5.88	2.00	11.76	1,531,147.17
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NB: Unit rate of Steel Bracing member of a floor = 1.015 x that of previous floor

Sub-Total:C5= 7,432,777.33

C6 Steel bracing work with beam extension

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
f-1	Ground Floor steel bracing insertion with beam extension cost from project data sheet, Out fill Shear wall, Column+Beaml_10, 5.88 sqm	sqm	107,246.00	5.88	2.00	11.76	1,261,212.96
f-2	1st. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beaml_10, 5.88 sqm	sqm	108,854.69	5.88	2.00	11.76	1,280,131.15
f-3	2nd. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beaml_10, 5.88 sqm	sqm	110,487.51	5.88	2.00	11.76	1,299,333.12
f-4	3rd. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beam_10, 5.88 sqm	sqm	112,144.82	5.88	2.00	11.76	1,318,823.12
f-5	4th. floor steel bracing insertion with beam extension cost from project data sheet, out fill shear wall, column+beam_10, 5.88 sqm	sqm	113,827.00	5.88	2.00	11.76	1,338,605.47

NB: Unit rate of steel bracing member of a floor = 1.015 x that of previous floor

Sub-Total:C6= 6,498,105.82

Total C= (C1+C2+C3+C4+C5+C6) 57,137,653.57

Sub-Total: B+C= 72,624,165.82

Sub-Total: A+B+C= 76,255,374.11

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4. Restoration and renovation civil works (D)

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
4.D1	Repair and relocation of internal water supply and sanitation	LS	D1	1	1	1	D1
4.D2	Repair and relocation of external water supply and sanitation	LS	D2	1	1	1	D2
4.D3	Repair and relocation of external drain & apron	LS	D3	1	1	1	D3

Sub-Total D=(D1+D2+D3) **D**

	Description	Unit	Unit Rate (Taka)	Qty/mem	Unit No	Total Qty	Total Amount (Tk.)
5.	Restoration and relocation of electrical works (E)	LS	E	1	1	1	E
6.	Fire-fighting (F)	LS	F	1		1	F

Sub Total G= A+B+C+D+E+F **G**

7. Quality assurance, material sample collection & testing (1% of G)

"H"= 1% of G

8. Contingency (probable unforeseen expenditure related to work (I)

8.A Price contingency (maximum 8.00% on Tk. G)

"J"= 8% of "G" or Actual need

8.B Physical contingency (maximum 2.00% on Tk. G)

"K"= 2% of "G" or Actual need

Sub-Total I = (J + K)

Grand Total L = (G+H+I)

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