

## **Appendix C**

### Construction Management Breadth Calculations

STRESSING TENDONS

$$12(25.7) = 300k$$

UNGROUTED STRAND, 50' SPAN # 3.63 / lb

$$(0.153 \text{ in}^2)(9 \text{ STRANDS})(178')(12''/\text{ft}) \times 2 = 5083 \text{ in}^3$$
$$+ (0.153 \text{ in}^2)(12 \text{ STRANDS})(178')(12''/\text{ft}) \times 2 = 7843 \text{ in}^3$$

$$(0.153)(3 \text{ STRANDS})(55')(12''/\text{ft}) \left( \frac{178}{3} \right) = 17,975 \text{ in}^3$$

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$$31,700 \text{ in}^3$$

$$\frac{31,700 \text{ in}^3}{12^3} = 18.34 \text{ ft}^3 \text{ TENDONS @ } 490 \text{ lb}/\text{ft}^3$$

$$(18.34)(490) = 9030 \text{ lbs. TENDONS}$$

FROM RS MEANS 2002, UNGROUTED STRAND, 300k, # 3.63 / lb.

\$ 32,779 TO LAY OUT & JACK TENDONS PER FLOOR

\$ 360,570 TOTAL FOR BUILDING

\$ 2.90 NOT INCLUDING O&P

$$(2.90)(9030) = 26,187 (11) = \$ 288,060$$

OUTPUT: 1475 lb / DAY

$$\frac{9030 \text{ lbs}}{1475} = 6.12 \text{ DAYS PER FLOOR}$$

### STRUCTURAL CONCRETE

$$\text{COLUMNS } 16" \times 16" = 256 \text{ in}^2 \quad \$ 842 / \text{c.y.}$$

$$\text{COLUMNS } 24" \times 24" = 576 \text{ in}^2 \quad \$ 636 / \text{c.y.}$$

$$\text{ACTUAL COLUMNS } 12" \times 24" = 288 \text{ in}^2$$

$$\text{LINEAR INTERPOLATION BETWEEN TWO} \Rightarrow \$ 822 / \text{c.y.}$$

$$2\frac{1}{2}" \text{ SAVED PER FLOOR} \times 11 \text{ FLOORS} = 27.5" \text{ COLUMN HEIGHT REDUCTION}$$

$$27.5" (36 \text{ COLUMNS}) (12" \times 24") = 285,120 \text{ in}^3$$

$$\frac{285,120}{12^3} = 165 \text{ ft}^3 \quad \frac{165}{3} = 6.11 \text{ c.y.}$$

$$\text{OUTPUT: } 14 \text{ c.y. / DAY} \quad \frac{6.11}{14} = 0.4 \text{ DAYS}$$

### ELEVATED SLABS

#### FLAT PLATE

$$\text{AVERAGE SPAN} = 19.37' \rightarrow \text{INTERPOLATE BETWEEN } \$ 275.45 \text{ \& } \$ 394.50$$
$$(10,000 \text{ ft}^2) (2\frac{1}{2}' / \text{ft}) (11) = 22,917 \text{ ft}^3$$

$$\frac{22,917}{3^3} = 849 \text{ c.y.} @ \$ 335 / \text{c.y.}$$

$$\text{OUTPUT: } 40 \text{ c.y. / DAY} \quad \frac{849}{40} = 21.2 \text{ DAYS}$$

### PLACING CONCRETE

$$\text{SLABS, 6-10" THICK, PUMPED} \\ \$ 14.85 / \text{c.y.}$$

$$\text{OUTPUT: } 160 \text{ c.y. / DAY}$$

$$\frac{849}{160} = 5.3 \text{ DAYS}$$

$$\text{COLUMNS } \$ 26 / \text{c.y.}$$

$$\text{WALLS } 12" \text{ THICK, PUMPED} \\ \$ 21.60 / \text{c.y.}$$

$$\text{OUTPUT: } 90 \text{ c.y. / DAY}$$

$$\text{OUTPUT: } 110 \text{ c.y. / DAY}$$

$$(200 \text{ ft}) (27.5 / 12) = 456 \text{ ft}^3$$

$$\frac{456}{3^3} = 17 \text{ c.y.}$$

PT MODEL

REBAR TOTAL  $\sim 38$  TONS

$38(1.2) = 46$  TONS INCLUDING LAPPING & SPLICING

PER DRAWINGS

REBAR PER FLOOR  $\sim 10$  TONS

$10(11)(1.2) = 132$  TONS TOTAL

DIFFERENCE = 86 TONS @ \$ 975 / TON

OUTPUT: 29 TONS / DAY

ADDITIONAL COSTS	BARE	INCL. O&P
TENDONS & JACKING	\$288,060	\$360,570
SAVINGS		
COLUMNS	\$5,022	\$7,000
SLABS	\$284,415	\$380,000
PLACING		
SLABS	\$12,608	\$17,800
COLUMNS	\$160	\$220
WALLS	\$370	\$510
REBAR	\$83,850	\$111,800
	<u>\$98,365</u>	<u>\$156,760</u>
SAVINGS		
LOCATION FACTOR = 91.5	\$90,000	\$143,435
INFLATION $\approx$ 1.2	\$108,000	\$172,100

SCHEDULE MODIFICATION

PER FLOOR

ADDITIONAL LABOR	DAYS
TENDON LAYOUT & STRESSING	6.12
REINFORCING PLACEMENT	1.5
LABOR SAVINGS	
PLACEMENT OF SLAB	0.5
REINFORCING PLACEMENT	4.13
WORKING OF SLAB	2
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	1 DAY

SCHEDULE WOULD TAKE APPROX. 1 DAY LONGER PER  
FLOOR ABOVE GRADE FOR A TOTAL OF 11 DAYS EXTRA.