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ASSIGNMENT-I

# CE-333

## ✱ Design for M25

$f'_{ck} = 31.6\ N/mm^2$, water cement ratio = 0.49
entrapped air = $0.01\ m^3$, cement used = OPC 43

CA10 : CA20 = 35 : 65 ---- for 50 to 100 mm slump (Non-Pumpable)

45 : 55 ---- for 125 to 175 mm slump (Pumpable)

Based on trial, Super plasticizer reduce water content by 23%.

Pumpable concrete reduce coarse aggregate volume by 10%.

Table : Consumption of Material per $m^3$

| Material → / Slump ↓ | Water (l) | Cement (kg) | FA (Sand) (kg) | CA (10) (kg) | CA (20) (kg) |
|---|---|---|---|---|---|
| 50 to 100mm | 191.6 | 391.02 | 660 | 410 | 765 |
| 125 to 175mm | 208.3 | 425.10 | 737 | 456 | 559 |
| 125 to 175mm with super plasticizer | 160.4 | 327.35 | 827 | 511 | 627 |

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## Table : Ratio by weight

| Material → / Slump ↓ | Water | Cement | FA(Sand) | CA(10) | CA(20) |
|---|---|---|---|---|---|
| 50 to 100mm | 0.49 | 1 | 1.69 | 1.05 | 1.96 |
| 125 to 175mm | 0.49 | 1 | 1.73 | 1.07 | 1.31 |
| 125 to 175 mm with super plasticizer | 0.49 | 1 | 2.53 | 1.56 | 1.92 |

## Table : Ratio by volume

| Material → / Slump ↓ | Water | Cement | FA(Sand) | CA(10) | CA(20) |
|---|---|---|---|---|---|
| 50 to 100mm | 0.637 | 1 | 1.26 | 0.86 | 1.52 |
| 125 to 175 mm | 0.637 | 1 | 1.29 | 0.87 | 1.01 |
| 125 to 175mm with super plasticizer | 0.637 | 1 | 1.88 | 1.28 | 1.49 |

## ☆ Design for M35

$f'_{ck} = 43.25$ N/mm$^2$, water cement ratio = 0.39
entrapped air = 0.01 m$^3$, Cement used = OPC 43

CA(10) : CA(20) = 35 : 65 ——— for 50 to 100 mm slump (Non-Pumpable)

= 45 : 55 ——— for 125 to 175 mm slump (Pumpable)

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Based on trial, super plasticizer reduce water content by 23%.

, Pumpable concrete reduce coarse aggregate volume by upto 10%.

Table: Consumption of Material per $m^3$

| Material → / Slump ↓ | Water (l) | Cement (kg) | FA (sand) (kg) | CA (10) (kg) | CA (20) (kg) |
|---|---|---|---|---|---|
| 50 to 100mm | 191.6 | 491 | 594 | 403 | 750 |
| 125 to 175mm | 208.3 | 534 | 662 | 445 | 545 |
| 125 to 175mm with super plasticizer | 160.4 | 411 | 757 | 508 | 623 |

Table: Ratio by weight

| Material → / Slump ↓ | Water | Cement | FA (sand) | CA (10) | CA (20) |
|---|---|---|---|---|---|
| 50 to 100mm | 0.39 | 1 | 1.21 | 0.82 | 1.53 |
| 125 to 175mm | 0.39 | 1 | 1.24 | 0.83 | 1.02 |
| 125 to 175mm with super plasticizer | 0.39 | 1 | 1.84 | 1.24 | 1.52 |

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## Table: Ratio by volume

| Material → / Slump | Water | Cement | FA (sand) | CA (10) | CA (20) |
|---|---|---|---|---|---|
| 50 to 100 mm | 0.507 | 1 | 0.90 | 0.67 | 1.18 |
| 125 to 175 mm | 0.507 | 1 | 0.92 | 0.68 | 0.79 |
| 125 to 175 mm with super plasticizer | 0.507 | 1 | 1.37 | 1.01 | 1.18 |

## ☆ Design for M45

$f'_{ck} = 53.25$ N/mm$^2$ , water cement ratio = 0.33
entrapped air = 0.01 m$^3$ , Cement used = OPC 43

CA 10 : CA 20 = 35 : 65 ——— for 50 to 100mm slump (Non-Pumpable)

= 45 : 55 ——— for 125 to 175mm slump (Pumpable)

Based on trial, super plasticizer reduce water content by 23%.

, pumpable concrete reduce coarse aggregate volume by upto 10%.

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## Table: Consumption of Material per m3

| Material → / Slump ↓ | Water (ℓ) | Cement (kg) | FA (sand) (kg) | CA (10) (kg) | CA (20) (kg) |
|---|---|---|---|---|---|
| 50 to 100mm | 191.6 | 581 | 546 | 390 | 727 |
| 125 to 175 mm | 208.3 | 631 | 612 | 428 | 525 |
| 125 to 175 mm with super plasticizer | 160.4 | 486 | 711 | 497 | 610 |

## Table: Ratio by weight

| Material → / Slump ↓ | Water | Cement | FA (sand) | CA (10) | CA (20) |
|---|---|---|---|---|---|
| 50 to 100mm | 0.33 | 1 | 0.94 | 0.67 | 1.25 |
| 125 to 175 mm | 0.33 | 1 | 0.97 | 0.68 | 0.83 |
| 125 to 175 mm with super plasticizer | 0.33 | 1 | 1.46 | 1.02 | 1.26 |

## Table: Ratio by volume

| Material → / Slump ↓ | Water | Cement | FA (sand) | CA (10) | CA (20) |
|---|---|---|---|---|---|
| 50 to 100 mm | 0.429 | 1 | 0.70 | 0.55 | 0.97 |
| 125 to 175 mm | 0.429 | 1 | 0.72 | 0.56 | 0.64 |
| 125 to 175 mm with super plasticizer | 0.429 | 1 | 1.08 | 0.83 | 0.98 |

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