SIMPLE DESIGN RULES THAT CAN REDUCE PROJECT COSTS

EPOWEFEE







Reinforced concrete is the material of choice for Architects and Engineers due to the fact that it can be sculpted into any shape or form while also acting as the primary structural support for any type of structure. While reinforced concrete is already a very cost effective building material, the designer can realize additional cost savings during the preliminary design stage of the project if they consider the following simple design rules.

FORMWORK CONSIDERATIONS

Select A Single Framing System

The use of multiple framing systems results in higher project costs. Multiple framing systems increase mobilization and formwork costs as well as extending the learning curve for the contractor's work force.

Consider The Use Of Architecturally Exposed Concrete

The extra cost for high quality formwork and concrete placement may be less than other cladding options.

Orient All Framing In One Direction For One-Way Systems

There will be less time-wasting confusion and fewer formwork challenges in the areas where the framing changes direction.

Design For The Use Of "Flying Forms"

Forming costs can be minimized when a repetitive framing system can be used ten or more times on a structure. Repetitive floor & wall layouts will allow for cost savings that can allow for more intricate formwork in high profile areas such as entrance lobbies and common areas.

Space Columns Uniformly From Floor-To-Floor

Uniform column layout results in simpler formwork that can be used repetitively from floor to floor.

Select A Standard Column Size

This can be achieved by varying the amount of reinforcing steel and the concrete strength within the column. This will allow for a single column form and will minimize the number of variations to meet slab or beam forms.

Use The Shallowest Floor Framing System

By minimizing the floor-to-floor height you will be reducing the costs associated with mechanical services, stairs and exterior building cladding. The limiting factor will be deflection considerations.

Make All Beams And Joists The Same Depth

The savings in formwork and shoring costs will exceed any additional costs for concrete and reinforcing steel. This will also provide a uniform ceiling elevation and minimize mechanical service installation difficulties.

Make The Height Of Drop Panels Fit Standard Lumber Dimensions

Standard sizes should be 2.25", 4.25", 6.25" or 8" (assuming the use of $\frac{3}{4}$ " plywood).

Use High Early Strength Concrete

This will allow for earlier form stripping and will reduce total construction time.

REINFORCING STEEL CONSIDERATIONS

Use The Largest Bar Size That Will Meet The Design Requirements

Large bars reduce the total number of bars that must be placed and minimize installation costs. Avoid the use of 10 M bars whenever possible.

Eliminate Bent Bars Wherever Possible

Bent bars increase fabrication costs and require greater storage area and sorting time on the job site.

Increase Beam Sizes To Avoid Minimum Bar Spacing

Minimum bar spacing results in tight rebar installations and it takes more time to properly place the material. Rebar lapping can also result in bar congestion, which makes proper concrete placement difficult.

Use Lap Splices Whenever Possible

The cost of additional bar length is usually less than cost of material and labour for mechanical splices.

CONCRETE

Use High Strength Concrete In Columns

The high strength may reduce the column size or the amount of reinforcing steel required for the column. High strength concrete may also allow for the use of one standard column size throughout the structure.

Do Not Specify Concrete Mix Designs

Allow the Contractor and Concrete Producer to develop site-specific mix designs that meet all of your design requirements and are compatible with the Contractors method of concrete placement. The numbers of mix designs should be limited to two to four to avoid possible ordering confusion.

Consider The Use Of Self Consolidating Concrete (SCC)

Heavily reinforced concrete columns and beams can be very congested with rebar, which prevents the proper placement of the concrete. SCC maximizes concrete flowability without harmful segregation and dramatically reduces honeycombing and rock pockets once the formwork is removed.

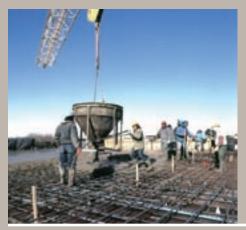
Limit The Coarse Aggregate Size To 20 mm Or Smaller If The Minimum Clear Bar Spacing Is 25 mm

Smaller coarse aggregate sizing may be required in high rebar congestion areas to avoid material segregation and concrete placement difficulties (honeycombing, rock pockets, etc).

Require A Concrete Quality Plan

This document will indicate how the contractor and their sub-contractors and material suppliers will ensure and verify that the final reinforced concrete product meets all of the specification requirements.











In 2000, the Ontario Cast-In-Place Concrete Development Council (OCCDC) was formed to aid the owner/developer, architect/engineer and design-build contractor in the decision-making process of choosing the best construction material for the framing system of new structures.

OCCDC promotes the benefits of reinforced concrete as the construction material of choice based upon the following advantages:

Fast-Track Construction

Cast-in-place concrete offers quicker start-ups and reduced total construction time

Cost Savings

Lower floor-to-floor heights, high fire resistance and minimal maintenance costs are achieved with cast-in-place systems

Structural Advantages

Design flexibility, structural integrity, sound and vibration isolation, as well as the ability to include underground parking are some of the advantages provided by concrete structures

Environmental Considerations

The use of local aggregates and recycled materials (slag & fly ash) in concrete, make it a "green" product that is requested by environmentally responsible owners

Local Economy Benefits

Cast-in-place concrete framing systems utilize the local work force and materials, as well as maximizing the economic benefit to the community

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