

## REINFORCEMENT: ITS POSITION, ITS SUPPORTS, & WHAT TO DO AT JOINTS

It is absolutely essential for the **rebar or the wire mesh** to be in the proper position to provide the advantages cited. The proper position is at or above the mid-depth of the slab. Some authorities recommend the steel be placed 50mm below the top surface of the concrete. Others recommend the steel be placed 1/3 of the depth down from the top of the slab. Some recommend the steel be placed at the mid-depth of the concrete. Any of these can be the appropriate choice, depending on the concept of design (reinforced for crack control, structural or for shrinkage compensating concrete). There is no question, however, that for a single reinforcement layer (steel in two directions, where they are in contact with one another, is considered as "one layer"), it must not be allowed to be below mid-depth. In general, positioning the reinforcement at 1/3 the depth from the top surface is reasonable and, when so positioned, will be effective. If the slab is to be 125mm or less in thickness, then positioning the steel at the mid-depth is recommended.

Since positioning is critical, support devices are essential. The steel must be supported with devices spaced so as to maintain the steel at the correct position

during the construction process and during the concrete placement. This, then, also involves the diameter (stiffness) of the bar or wire in combination with the support spacings. If the bars or wires, as supported, are not stiff enough for concrete workers to stand upon, then their spacings must be wide enough for the workers to stand between the wires or bars. Spacings should be at least 305mm center-to-center. **Bar or wire** diameters should be of sufficient size and adequately supported to be stiff enough to remain in position during the construction process.

When reinforcement is placed in a slab, there is always the question of what to do with the steel at joints, particularly at contraction joints. The answer to this question is dependent upon the intent of the joint. If the joint is to be a working joint, that is, to open and provide relief for drying shrinkage strains in the concrete, then it is best to discontinue all steel at that joint. Any amount of steel which continues through the contraction joint will offer restraint to motion depending upon the amount of that area. If the joint is to be closed, that is, it is not expected to open at all over time, then the steel may be continued through the joint. If load transfer is required at the joint, but the distributed steel is interrupted, then dowels should be specified.

Contributed by Boyd Ringo

## REFERENCES:

*Guide for Concrete Floor and Slab Construction, ACI 302.1R-89*, American Concrete Institute, Detroit, Michigan, 1989.

*Building Code Requirements for Reinforced Concrete, and Commentary on Building Code Requirements for Reinforced Concrete, ACI 318-89 and ACI 318R-89*, American Concrete Institute, Detroit, Michigan, 1989.

*Structural Welded Wire Fabric Detailing Manual, Part I (1983) and Part II (1989)*, Wire Reinforcement Institute, Washington, D.C.

*Concrete Floors on Ground (EB075D)*, 2nd Edition, Portland Cement Association, Skokie, Illinois, 1990.

*Design of Slabs on Grade, ACI 360R-92*, American Concrete Institute, Detroit, Michigan, 1992. Note: report due to be published June, 1992. Document is available until February, 1992 for public review and comment.

*Welded Steel Wire Fabric for Concrete Reinforcement*, CSA Standard G30.5-M1983.

*Billet-Steel Bars for Concrete Reinforcement*, CSA Standard G30.12-M1977.

*Deformed Steel Wire Fabric for Concrete Reinforcement*, CSA Standard G30.15-M1983.

*Weldable Low Alloy Steel Deformed Bars for Concrete Reinforcement*, CSA Standard G30.16-M1977.

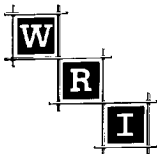
*Design of Concrete Structures for Buildings, CAN3-A23.3-M84*.



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