DESIGN to AS 3600 of SUSPENDED CONCRETE FLOORS REINFORCED with CLASS L MESH

A new Technical Note which addresses the design of suspended concrete floors, reinforced with low-ductility Class L mesh in accordance with the current edition of the Concrete Structures Standard AS 3600:2001, is now available from the SRIA web site.

Scope

Changes to the Standard made in two amendments (1 & 2) concerning the use of Class L mesh as main reinforcement are fully accounted for.

Design for serviceability and ultimate strength are addressed. Important aspects of design not directly addressed in AS 3600 are clarified.

A worked example is included for the design of a slab in accordance with AS 3600, reinforced with Class L mesh for strength, deflection and crack control.

Building Code of Australia (BCA)

The two complementary Australian Standards AS 3600:2001 *Concrete structures* and AS/NZS 4671:2001 *Steel reinforcing materials* are both given legal status by being referenced in the current Building Code of Australia (BCA). Designs developed using these Standards comply with the Deemed-to-Satisfy Provisions of the BCA and accordingly fully satisfy its Performance Requirements.

These two Standards define the minimum properties, and design and construction requirements for Class L mesh used as reinforcing steel in suspended concrete floors.

AS/NZS 4671:2001

The standard grade of ribbed reinforcing mesh 500L referred to in AS/NZS 4671 has a nominal yield stress, f_{sy}, of 500 MPa and is designated as having low (L) ductility.

Its ductility is characterised by uniform strain, ε_{su}, and tensile-strength-to-yield-stress ratio, f_t/f_{sy}, for which compliance with Appendix A of AS/NZS 4671 must be demonstrated. Minimum lower characteristic values for Class L mesh are ε_{suk} = 1.5% and $(f_t/f_{sy})_k$ = 1.03, on which the design rules in AS 3600 are based. Significantly higher values can be achieved in practice. As well as confirming satisfactory mechanical properties, weld-shear strengths and geometric measurements must also be confirmed.

AS 3600:2001

The use of Class L mesh as main reinforcing steel in suspended concrete floors is permitted by the Australian Concrete Structures Standard AS 3600:2001.

It may be used in conjunction with normal ductility (Class N) reinforcing bars, or prestressing tendons. It is also widely used as main and secondary reinforcement in composite slabs incorporating profiled steel decking in the soffit, the design of which is not addressed in AS 3600, but similar principles apply.

The members of the suspended concrete floors may comprise beams or slabs, and the slabs may be one-way or two-way.

With the move to 500 MPa as the primary standard strength grade for main reinforcing steel in the form of bars or mesh, the importance of steel ductility is now formally recognised in AS 3600.

Suspended Concrete Floor Construction using Class L Mesh

Worked Example

In particular it is shown in the worked example that:

- the design bending moments for serviceability can now be determined directly using the new design rules;
- the Class L mesh is multi-functional, in particular controlling cracking due to shrinkage and temperature effects under conditions of full restraint, and also serving as main flexural steel under ambient and elevated temperature (fire) conditions;
- an inconsequential extra amount of reinforcing steel is required as a result of the low ductility of the Class L mesh compared with Class N bars;
- the Class L mesh is augmented by Class N bars in peak moment regions over the supports, effectively negating the impact of the lower value of ϕ = 0.64 for Class L steel; and
- Class L mesh is fully effective at controlling vertical deflections, and providing for vertical shear strength, particularly in the vicinity of the supporting walls were shear forces are maximum.

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For further information on steel reinforcement or any other associated matters, contact SRIA on: ***(02) 9410 3224***