



Beware of limitations Cold-worked wire mesh

Issues of concern

In some situations where ductility in an earthquake may be required, cold-worked wire mesh may seriously affect the performance and integrity of the structure.

As the commonly specified standard mesh has a very limited ductility, it may not be able to withstand the strains imposed as a result of the design actions (displacements, forces). This can cause the mesh to fracture and reduce the capacity of the structural element and the overall performance of the structure.

Designers must ensure they specify seismic-grade steel reinforcing bars in areas requiring ductile performance of the steel. Construction contractors must ensure the design requirements are correctly implemented on site and that care is taken when using mesh on site.

Background

Concerns have been expressed about the use of low ductility mesh in floor diaphragms that are expected to undergo large displacements requiring a high level of ductile performance from the steel.

Amendment 3 (March 2004) to the Concrete Structures Standard, NZS 3101: 1995, Clause 7.3.1.2, requires welded wire fabric to have a uniform elongation of at least 10% unless the yielding of the reinforcement will not occur at the ultimate limit state or the consequences of yielding or rupture will not affect the structural integrity of the structure.

Further information: AS/NZS 4671 Steel Reinforcing Materials, NZS 3101 Concrete Structures, NZS 3109 Concrete Construction.

Don't

- ✘ **Don't** use cold-worked (ie, standard) wire mesh in seismic diaphragms or as primary flexural reinforcement in slabs where there is the potential for yielding of the reinforcement.
- ✘ **Don't** use standard cold-worked mesh if high ductility mesh is specified.
- ✘ **Don't** use Grade E (Earthquake) machine-welded wire mesh unless it has been shown that the mesh in its welded condition is suitable for use in ductile demand situations (in particular the elongation requirements).

Do

- ✔ **Do** use Grade E (Earthquake) 6, 10 or 12 mm diameter bars instead of mesh in areas of high ductility demand in floor slabs.
- ✔ **Do** obtain a copy of NZS 3109 Concrete Construction and AS/NZS 4671 Steel Reinforcing Materials.
- ✔ **Do** obtain a copy of Amendment 3 to NZS 3101 Concrete Structures.

Figure 1 Separation of floor slab putting high strains on topping reinforcement.
Source: University of Canterbury Civil Engineering Department, J Matthews



Note that this Practice Advisory is issued as guidance information in accordance with section 175 of the Building Act 2004 and, if used, does not relieve any person of the obligation to consider any matter to which the information relates according to the circumstances of the particular case.