LIGHT FRAMING CODE REVISION

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NZS 3604, first published back in 1978 and revised in 1981, 1984, and 1990, is being revised again. As always, the revision is controversial because it affects many interested parties with sometimes conflicting interests. The revised draft for comment was prepared under contract to Standards New Zealand by Mr Ernest Lapish of CLC Consulting Group, Pakuranga, Auckland. Ernie also produced the draft for the very first NZS 3604 so has a vast amount of experience in both writing and using codes.

This time the revision seems to have attracted more than the usual publicity, with comments in the popular press concentrating on the issues of the increased framing size and resulting increased cost, the greater number of tables, and reduction in maximum allowable span in some of those tables. There is some truth in all of these comments but the changes so far are not major and very much less significant than when NZS 3604 first burst forth on the building scene as a means of compliance with the requirements of NZS 1900 Chapter 6.1. This standard has since been replaced under the Building Act by the New Zealand Building Code.

The increased size is largely due to the incorporation of many figures from MP 3600, A Builders Guide to NZS 3604. Some of the tables have been revised, to cover a greater range of parameters and more appropriate values. As well, the material has been reorganised to eliminate obsolete clauses, introduce new systems for some areas, and group some of the subject matter together.

The idea of combining 3604 and 3600 was put in front of the committee before the first meeting and it was decided on a show of letters to go with the combination plan. It has certainly increased the bulk from 226 pages for the 1990 version to 367 pages in the current draft. The objection is that builders will no longer be able to carry it around in their aprons. I doubt whether they ever did; not even the builders guide, MP 3600, which was A4 format and ran to 186 pages. However it does raise the question as to who the users of NZS 3604 are? (For the record, the number of A4 pages in each edition of NZS 3604 are 1978, 123; 1981, 136; 1984, 128; 1990, 226. NZS 1900 Chapter 6.1:1964 which was replaced by NZS 3604, ran to 38, A5 pages.)

I recall the question of who the users of NZS 3604 would be, being discussed during the deliberations of the first NZS 3604 committee and the consensus was that it was primarily a designers' rather than a builders' document. However, builders would of course use it in the course of their training and would find it an essential reference document as to structural and constructional details even if they did not use the design information. For this very reason the builders' guide was produced in 1992 - some time after 3604 emerged. I think incorporation of the diagrams of MP 3600 in a combined NZS 3604 is probably a good thing on the whole, but a separate builders' guide stripped of the heavy design information will still find a market. Yes, cost is a consideration, but a fraction of the cost of remedying just one mistake that could have been avoided by heeding the code.

Tables are always a compromise between engineering efficiency, obtained with small increments in loads or spans and leading to large tables, and user efficiency, with large increments in the variables and small tables that are quick and easy to look up.

It is a justifiable approach for the table writer to offer a reasonably complete table and for the committee to establish the appropriate size. In the first committee, I took on the job of preparing the stud tables. The computer generated vast wodges of paper which were refined to the present tables which seem to have stood the test of time. However we did look at much reduced tables occupying only half a page in total but felt that the engineering compromises (in the sense that a larger size would be used where it was not really needed) were too frequent so opted for the present tables.

As far as table changes are concerned, there have been a few, but most tables are left unchanged or changed in minor respects only. The lintel tables in their present form do look a little daunting but there has been a need for much greater flexibility in these tables for some time and most users will welcome the greater range of options permitted in the new proposals.

It does appear from builders' comments that the quality of radiata pine structural timber is falling, in that strength and stiffness are reducing and that there is an increasing incidence of corewood which leads to distortion on drying. Work is being carried out at FRI to establish the extent of the problem. If we can put reliable numbers on the strength property changes, then there may be some recommendations regarding a reduction in permitted maximum spans. This will not break the bank or cause severe economic disruption in the building industry as say a 10% reduction in stiffness can be compensated for roughly by a 3% reduction in maximum span. (Assuming a simply supported, uniformly loaded, relative deflection limited beam.)

For the sake of completeness, it is worth while having a qualitative peek at the forestry economics picture which may have led us to the present declining structural properties. Modern forest management aims to maximise the value of the forest over the rotation cycle. It does this by growing trees fast so that the initial investment in land, planting and tending is realised early thus avoiding the compounding interest problem.

Few fat trees are cheaper to saw, for a given wood volume, than many skinny trees, so that trees are spaced widely by thinning to encourage diameter growth. Pruning of the first 6 metre log ensures that valuable clear wood is produced. Framing timber does not command a high enough price to justify sawing from the clear wood of the bottom log, so it comes from the upper logs and the knotty core of the bottom log. Radiata pine increases in density and strength properties as you move out from the pith so that beyond about 10 rings from the pith, the older wood is of good quality. Upper logs of fast grown trees have much less of this good quality timber than the lower logs of slow grown trees. As well as this, the branches of the upper logs of widely spaced trees are larger, leading to larger knots. All these factors combine to reduce the quality of framing timber.

However, it may well be that the economics are still favourable even if the price of framing timber reduces because of the small increase in the quantities needed to do a particular job. The loss in value of the framing timber is probably more than compensated for by the high value of the pruned butt log.

The real killer for timber framing in building would not be a possible decrease in strength properties, but rather a large increase in the amount of distortion, causing builders to switch to distortion free materials such as steel framing. However, the timber industry have this covered through the production of kiln dried framing which has now captured about half of the framing market.

Kiln dried timber has other advantages such as lighter handling weight, reduced shrinkage and elimination of waiting time before closing in. Contrary to popular belief, it is not stiffer than green timber because the shrinkage compensates for the increase in modulus of elasticity and in any case span tables are based on the dried out properties of the timber as that is the condition the timber is in for all but the first few months of its life. It is worth noting that because of the difference in the dry planed size and the green planed size dried out, the green member is often stiffer than the kiln dried member.
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