Appendix I Theory and discussion – composite slabs

1 Introduction

A composite slab uses profiled metal sheeting of various types as permanent formwork and bottom reinforcement to a concrete slab that will also generally incorporate conventional top reinforcement. To be effective, the sheeting must have sufficient strength to support the wet concrete during construction. Once the concrete has hardened it is also imperative that effective bond develops between the concrete and the profiled metal sheeting in order that it functions as reinforcement and does not simply slide against the concrete as bending strains develop.

The design of composite slabs is relatively complex but the input information to the design process is simple and self contained. Generally a composite slab is a one way slab carrying self weight plus a uniformly distributed load. The input information to the design process is then:

- The exposure classification
- The slab span
- The slab continuity conditions (simple span, continuous end span or continuous internal span)
- The live load
- The maximum span to deflection ratio (including short term and long term loading effects)
- The required fire resistance level
- The required degree of crack control

This combination of relatively complex design theory, but simple input information, makes the design of composite slabs ideal for the development of software design aids. Fortunately the manufacturers and distributors of profiled metal sheeting for composite slabs have invested considerable money and effort in developing such design aids. This Appendix does not attempt to develop the theory of composite slab design. It does provide some discussion regarding theoretical aspects but for convenience focuses on the use of one particular proprietary design aid.

DISCLAIMER

The authors of this design example have not undertaken a review of the particular design aid described herein and are in no position to comment on the completeness or correctness of the design processes embodied in this design aid.

2 Alternative profiled metal sheeting products for composite slabs

Within the context of this educational design example it is assumed that all manufacturer's products are of equal quality and economy. The choice on a particular (real) project will depend on negotiations by the contractor with the different suppliers and may be influenced by a range of factors not considered within this design. For convenience in developing this text, only a single supplier's product is considered in this design example. For reference, the current major suppliers and their web sites are as follows:

Stramit	http://www.stramit.com.au/ (Click on Downloads / Product technical manuals)
Bluescope (Lysaght)	http://www.bluescopesteel.com.au/au/ (Click on Our Products / Building / Formwork and slabs.) All information presented below has been obtained from this site.
Fielders	http://www.fielders.com.au/home.asp (Click on Design Tools / KingFlor Designer)

The following represent three Lysaght sheeting alternatives. (Other suppliers offer similar products).

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