

## Loads on Newly-Finished Composite Floors

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### Key Words

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### Introduction

This article is written in response to frequently asked questions regarding the performance of composite floors soon after concreting. This Steel Advisor article clarifies the basis for some of the requirements given in national and international good practice guides, and provides supplementary information to assist designers when considering this important load case.

### Loads on newly-finished composite floors

In both HERA Report R4-107 and SCI P300, it is recommended that props should not be removed, or additional loads applied, until the concrete has reached at least 75% of its design strength (as indicated by 'control' concrete cylinder tests). The 75% figure is based on recommendations originally presented in SCI P090, which is based on the assumption that the imposed loading after concreting does not exceed 1.5 kN/m<sup>2</sup> and, from the *m-k* methodology presented in BS5950-4, assuming that the shear bond at the interface between the slab and the deck is proportional to the concrete strength.

If the slab is to be loaded before 28-days after concreting, its strength at the time of loading needs to be established (possibly by testing the concrete cylinders early), and an effective 'design strength' agreed with the Structural Designer. If propped construction is used in this situation, particular attention should be paid to the effects of cracking and increased deflections due to creep, which may be estimated using the appropriate elastic modulus for the concrete from NZS3101.

The following list gives examples of typical construction loads (items are assumed to be placed on pallets, which should always be positioned directly over the support beams):

- Concrete blocks: a 1 m high pallet of blocks applies a load up to 10 kN/m<sup>2</sup>.
- Bricks: a 1 m high pallet of bricks can exert a load of over 15 kN/m<sup>2</sup>.
- Bags of fire protection: a bag of fire protection material normally weighs 25 kg. A 1 m high pallet of bags can be equivalent to a load of 2.5 kN/m<sup>2</sup>.
- Bags of cement: bags of cement weigh 25 kg each. A standard pallet of these weighs 1,400 kg (12 kN/m<sup>2</sup>).

The application of very heavy construction loads should always be referred to the Structural Designer. When considering the location of such loads, it is best to position them over the beams wherever possible. Examples of such loads are:

- Generators: welding generators can apply a load of 50 kN.
- Fork lift trucks: fork lift trucks can exert a load up to 100 kN, not including their live load. In general, vehicles with axle weights above 3 tonnes should be used only if the slab has been designed/checked specifically for that purpose.
- Crane counter weights: each counter weight is marked clearly with the value of its weight.

For assessing metal deck slabs subject to heavy concentrated construction or in service loadings refer to Steel Advisor article CMP1006 (to be published).

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