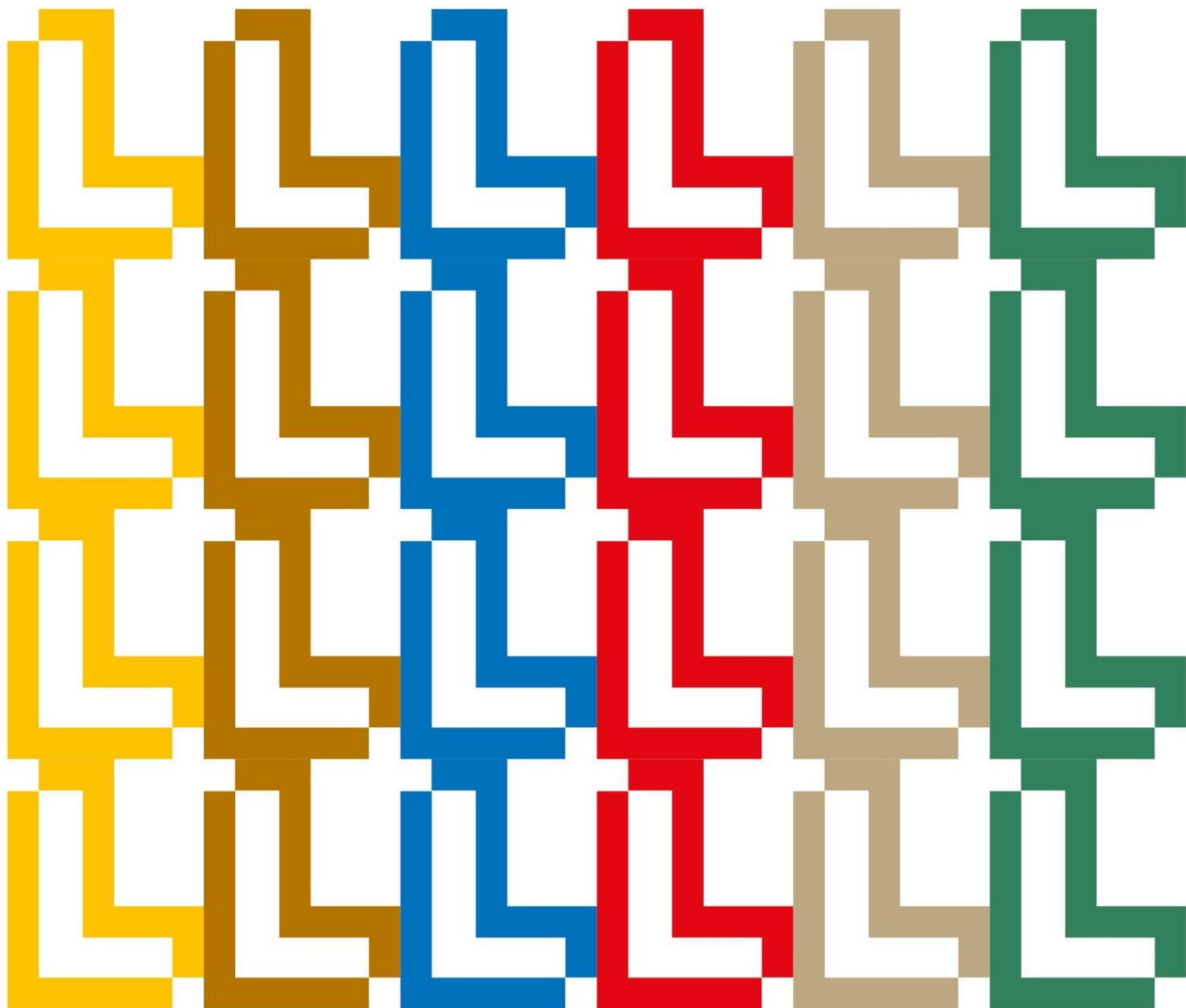




Guide to new joists

Guide to the design of the addition of new joists inside and on top of the existing floor

INDEX

1. INTRODUCTION 3

2. NEW JOISTS ON TOP OF THE FLOOR..... 3

2.1. DESCRIPTION.....3

2.2. IMPLEMENTATION4

3. NEW JOISTS INSIDE THE FLOOR..... 5

3.1. DESCRIPTION.....5

3.2. IMPLEMENTATION5



1. INTRODUCTION

If the flexural (positive and negative) and shear verifications are not verified, and less invasive solutions such as the use of FRCM systems, the insertion of pieces of reinforcement at the supports and the realisation of solid concrete zones at the supports do not allow these problems to be resolved, the solution to bring the floor to verification is the **realisation of appropriate new joists**, inside the floor or on top of the floor, described below.

2. NEW JOISTS ON TOP OF THE FLOOR

2.1. Description

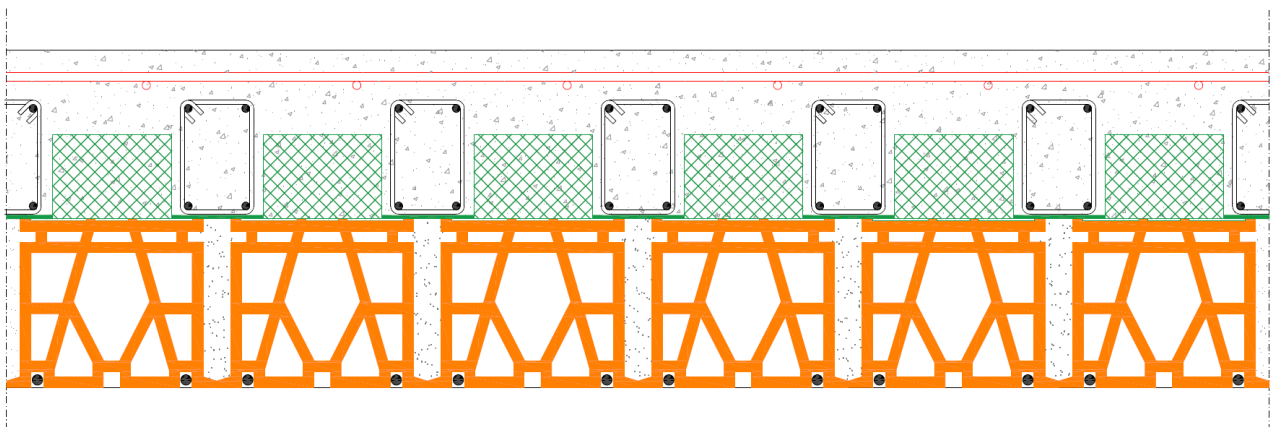
It is proposed to construct a **structural lightweight concrete slab above the existing slab**. This solution involves the **laying of polystyrene/lightening panels** above the surface of the existing floor with the function of additional lightening. These panels are laid at a precise spacing in relation to the geometry of the slab. In the voids left by the parallel joining of the rows of panels, **reinforcement cages** are inserted to create new joists, which are then incorporated in the light structural concrete cast.

The solution is completed with the laying of a welded mesh with the purpose of creating a load distribution slab.

The connection to the existing ceiling is provided by **Chemical Connector CS**.

This solution makes it possible to construct a new slab with a low thickness, typically between **11-12 cm**, and its task is to support the existing floor and all other loads.

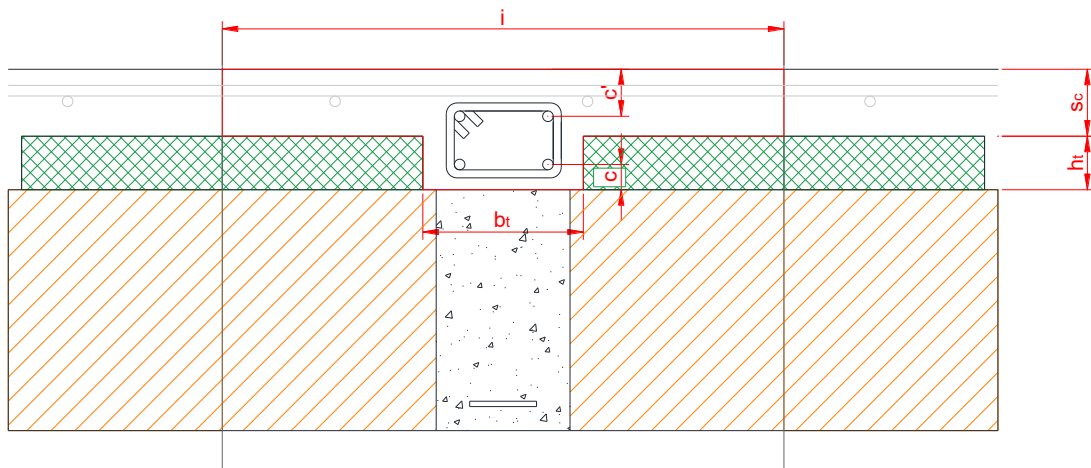
It is a solution that is quick and easy to implement on site. A typical section is shown below.



2.2. Implementation

In order to proceed with the design, it is necessary to define the geometry of the new joist with a T-section using the following dimensions:

- **New joist width:** the base of the new joist is determined by the voids left by the parallel rows of lightening panels; it must be of sufficient width to allow for the positioning of the reinforcements required by the design;
- **New joist depth:** a minimum depth of 6 cm is suggested to ensure sufficient depth for the positioning of the reinforcement;
- **New slab thickness:** it is suggested to adopt a minimum thickness of 5/6 cm and, in any case, ensuring that the thickness of the slab is comparable to the thickness of the lightening panel;
- **New joists spacing:** Typically, a new joist is built above each existing joist, so the new joists spacing have to be equal to the existing floor spacing.



3. NEW JOISTS INSIDE THE FLOOR

3.1. Description

The solution proposed below makes possible to **keep thicknesses as low as possible** and to reinforce the existing slab.

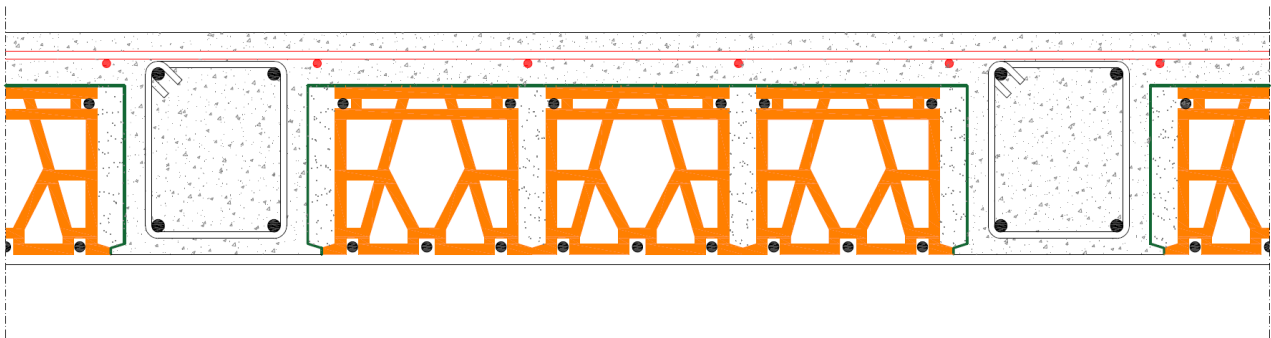
New joists inside the floor consist in the the creation of **structural lightweight concrete joist** and reinforcement placed within the voids specifically created **by removing rows** of existing floor **hollow bricks** at appropriately assessed intervals.

Finally, the solution consists of the laying of a welded mesh above the existing floor, with the aim of creating a load-distribution slab.

This is completed with a structural lightweight concrete casting.

The connection to the existing floor is provided by **Chemical Connector CS**.

The solution appears to be very efficient from a performance point of view and allows the thicknesses to be limited to those set by the design. The proposed solution is presented graphically below.



3.2. Implementation

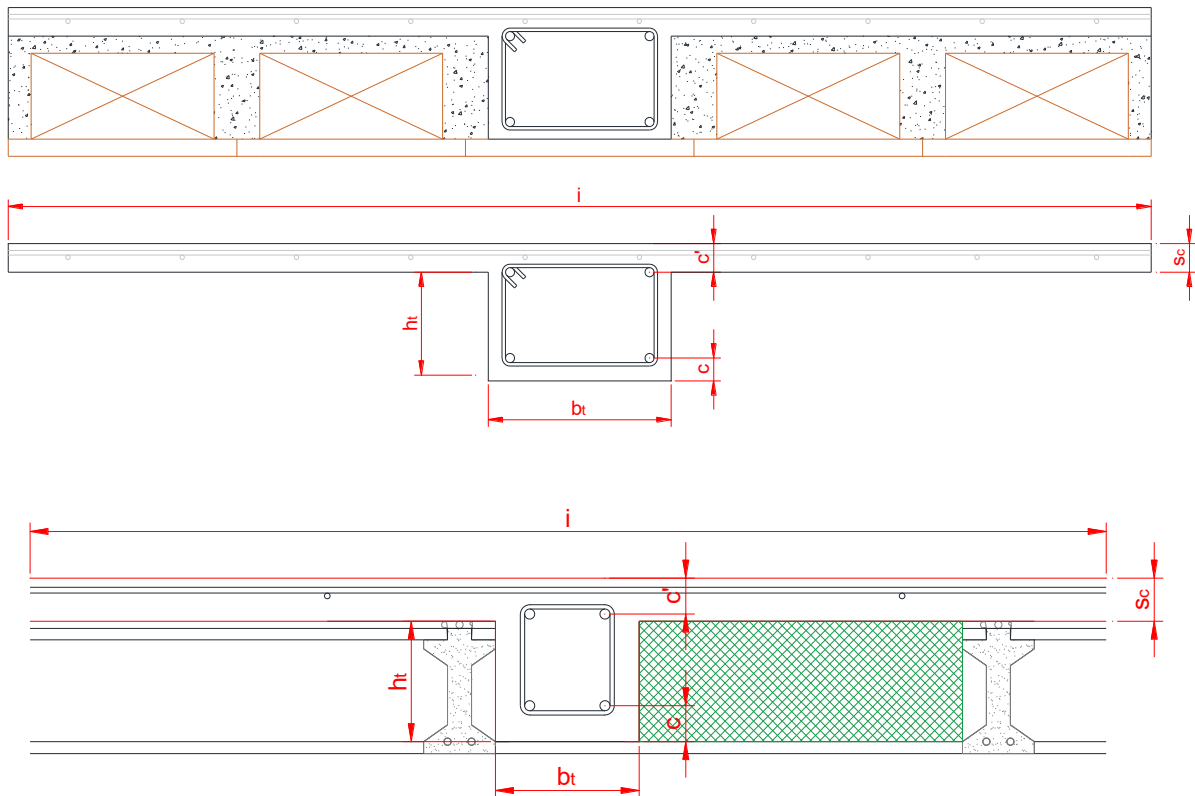
In order to proceed with the design, it is necessary to define the geometry of the new T-joist using the following dimensions:

- **New joist width**: the new joist is created in the void obtained after the removal of the hollow bricks, therefore, the base of the new joist is equal to the width of the hollow brick in the case of classic brick floors; or, in the case of floors where the existing joist has small dimensions, the base of the joist can be set equal to the spacing of the existing floor; or, in the case of prefabricated floors or classic concrete floors with large hollow bricks, the joist base is arbitrarily defined and the remaining space is filled with lightening panels (see following pictures);
- **New joist depth**: in the case of a floor without existing slab, the depth of the new joist is equal to the depth of the existing joist, while in the case of a floor with an existing slab, the depth of the new joist



is the sum of the depth of the existing joist and the thickness of the existing slab. It is allowed to use lower depths if, for example, there is a brick in the lower part of the existing floor;

- **New slab thickness:** in order to keep the total thickness as low as possible, the thickness of the slab remains as previously defined;
- **New joists spacing:** the spacing of the new joist must be a multiple of the spacing of the existing floor. It is advisable to design new joists with a maximum spacing of 150/180 cm.



Best regards.

Technical Support

Laterlite

