# *Construction of flat floor slabs*

Pre-conditions

Preparation

Self-inspection

Execution

This **work instruction** is designed for use in detailed planning and preparation of work on construction projects. With thorough planning high levels of personal safety and optimal work apportionment can be achieved at the same time as the work can be organized efficiently and cost effectively.

# Precast filigree floor slabs

Precast filigree floor slabs is a formwork system with high dimensional accuracy.
It consists of an approximately 45 mm thick concrete slab with embedded reinforcement.
The top surface is rough for good adhesion with topping.
The underside is smooth and nonporous, making it ready for painting.

The precast filigree floor slab is manufactured with field reinforcement and the reinforcing carrier. Under- and diagonal wire in the carrier is embedded in the plate floor structure. The reinforcement carriers are bracing elements during transport and installation, and then acts as reinforcement between the plate floor structure and topping.

Installations
Precast filigree floor slabs can be equipped with various installations. For example, electrical boxes and entrances for electric installations to internal walls, ventilation fixings, handrail brackets and boundary formwork. In addition, it is possible to prepare holes for plumbing and setting out of bathroom units on the top of the filigree floor slab as desired.

On an assembly plans the supporting construction is shown.

The installation Manual facilitates the planning of the installation sequence to the assembly itself.

**Technical description**
Thickness: 40 - 50 mm. (thicker variants exists)
Width: 2400 mm is standard.
Length: Technical length of about 12 meters, construction length from 6 to 8.5 m.

Work activity: Installation of filigree floor slabs

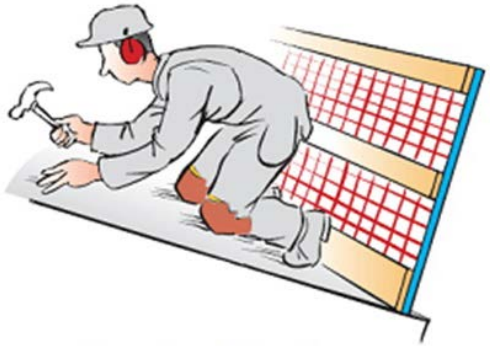
| Work activity & Problem | P | C | Risk= P*C | Action |
|---|---|---|---|---|
| Falling during work – assembly and transportation | 2 | 200 | 400 | Use fall protection harness |
| Cluttered workplace= twist/fall-injuries | 5 | 70 | 350 | Regular tidying |
| Strong winds can overturn formwork (shoring and stray beams) | 3 | 100 | 300 | Secure stability continuously |
| Crane Working with material – falling & crushing | 3 | 70 | 210 | Educate in crane directing/strapping |
| Falling material/crushing injuries | 10 | 15 | 150 | Helmet compulsory |
| | | | | |

| | | **Assessment of probability** | | **Assessment of consequences** | | |
|---|---|---|---|---|---|---|
| Probability = P | P = 0,1 | Very unlikely | (<1 times/10 years) | C=0,5 | Trifle | |
| Consequence = C | P = 1 | Unlikely | (1 times/10 years) | C=1 | Tiny | ( 1 - 2 days sick leave) |
| Risk = P * C | P = 3 | Low probability | (1 times/3 years) | C=5 | Small | ( 3 - 7 days sick leave) |
| | P = 10 | Relative probability | (1 times/year) | C=15 | Tactile | ( 8 - 29 - ” - ) |
| | P = 30 | Probable | (1 times/month) | C=70 | Severe | (30-299 - ” - ) |
| | | | | C=500 | Very severe | (>300 - ” - ) |

*Text and images include the Working Environment Authority's brochure Safer Construction Work*

## Personal Protective Equipment § 71

Safety helmet and protective footwear should be used unless this is clearly unnecessary. Other personal protective equipment such as eye protection, hearing protection and gloves should be worn when required.



*Guardrail at roofing works*

## First Aid § 31

First Aid should be available. Staff who are trained to provide First Aid should always be available. Facilities and First Aid equipment should be marked with signs. There shall also be signs presenting phone numbers, address and, if necessary, route description of the local emergency services.

Regulations related to First Aid are presented in AFS 1999:7 "First Aid and Emergency Support".

*Personal fall protection equipment, full body harness sewn into the vest.*

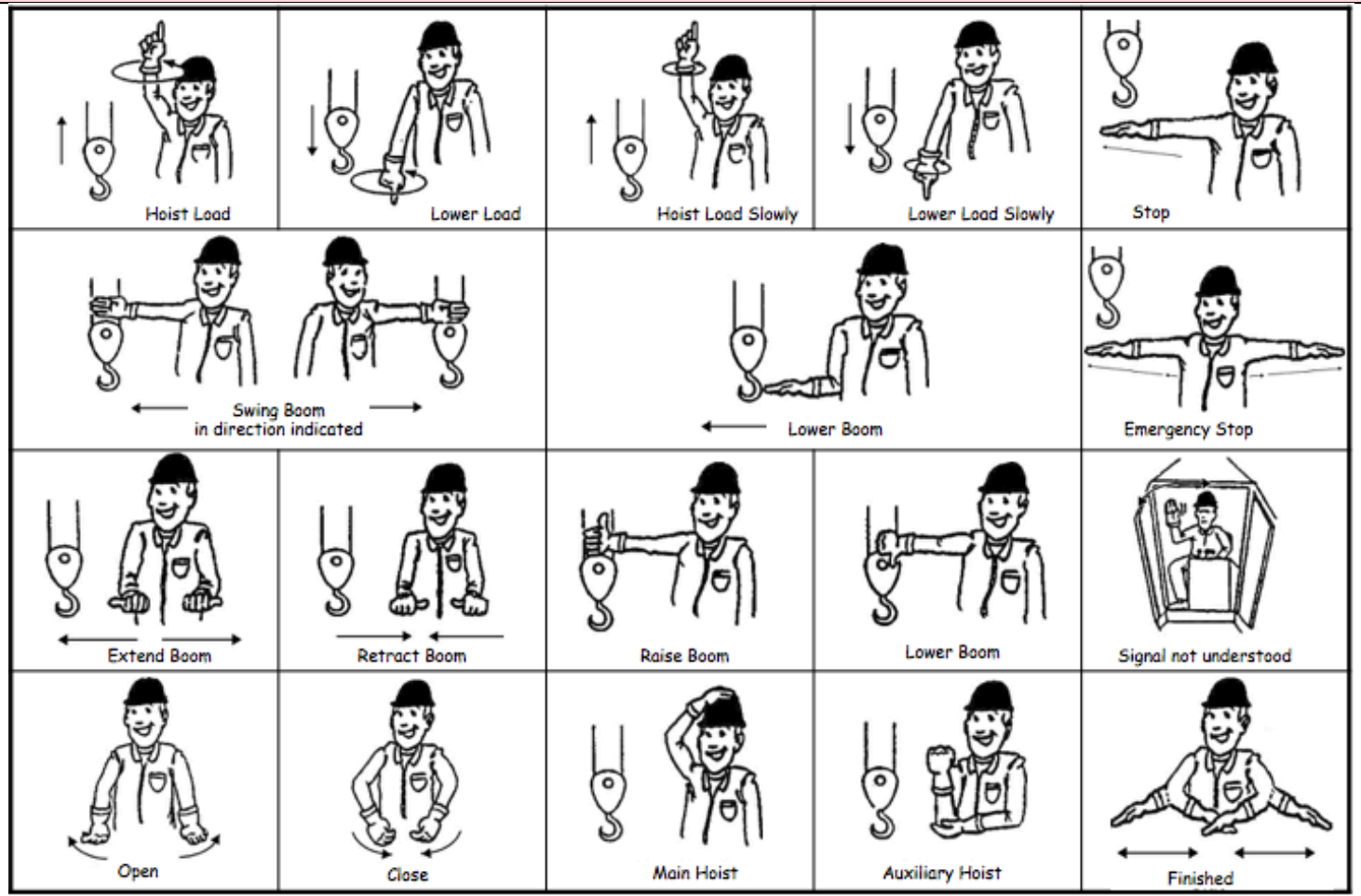
## Watch out for falling objects § 67

Areas where there is a risk of falling objects should be cordoned off and marked. If such areas must be entered as the canopy covered walkways or similar shall be provided.

# Pre-conditions 4(4)

## Crane directing

*(See also AFS 2008:13, Appendix 3)*



## Tools and Equipment:

**Equipment for erection of flat floor slabs**

- ❑ Skewer iron
- ❑ 2 crowbars
- ❑ Bending tool for rebar
- ❑ Hand grinder and cutting disc for concrete

**Hand Tools**

- ❑ Hammer
- ❑ 2 ladders about 3.5 m
- ❑ Protective handrails
- ❑ Railing stanchions and bars
- ❑ 2 fittings type FRIMEDA for crane lifting provided by the supplier

**Protective equipment:**

- ❑ Fall protection harness

# Preparation 2(3)

## Deliveries - logistics

Approximately 280 to 340 m² precast filigree floor slabs can be supplied in a full lorry load with a lorry and trailer of about 24 m in length.

Delivery is ordered four days prior to the required arrival date at the construction site. The filigree floor slab elements are stored in prepared batches and delivered in the correct installation order. With good planning, the elements should go directly from the lorry to the formwork construction on the site. Normal installation time is under two hours per full delivery and is performed by two people.

After installation the laid elements are provided with net strip over the joint. The slab may be supplemented with additional bottom and top of rebar reinforcement.

*Avoid excessive stockpiling at this workplace!*

**Helmet and protective gear must be worn for these jobs!**

## Rule of thumb 1

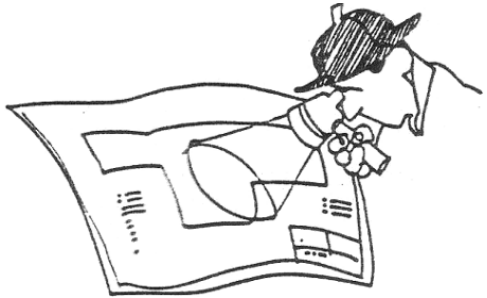
The material must go directly from the delivery vehicle to the installation site. Shortcomings in the planning manifest themselves when large elements as shown below, obstruct logistics of construction work. In addition, the order in which they shall be laid in place ...

To the right props are moved to the next vaulting site.

| No | Check | Method or equipment | Frequency | Result | Date Signature | Deviation/Remedy Approval/Non-A |
|---|---|---|---|---|---|---|
| 1 | Assembly | | | | | |
| 2 | Sealing | | | | | |
| 3 | Additional reinforcement | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| | | | | | | |

# Quality criteria for the project and the product

- Study Drawings, Specifications and Inspection planning
- Think through the alternative **methods of production** and handling of materials, tools etc. that can meet the requirements



## *Pay particular attention to*

- check the location and orientation of flat slabs - the right elements in right direction
- spigots etc. become faulty if the flat floor slab is misaligned
- do not install damaged flat slabs
- Strengthen the shoring where the “over” reinforcement has been cut away – prop the slab until the floor holds for its load.

## Setting out

After props have been put into place and roughly adjusted the props are then further adjusted to the correct height. Here with lasers and “bandy club”.

Bending Spines and stray beams are of several different brands and materials.

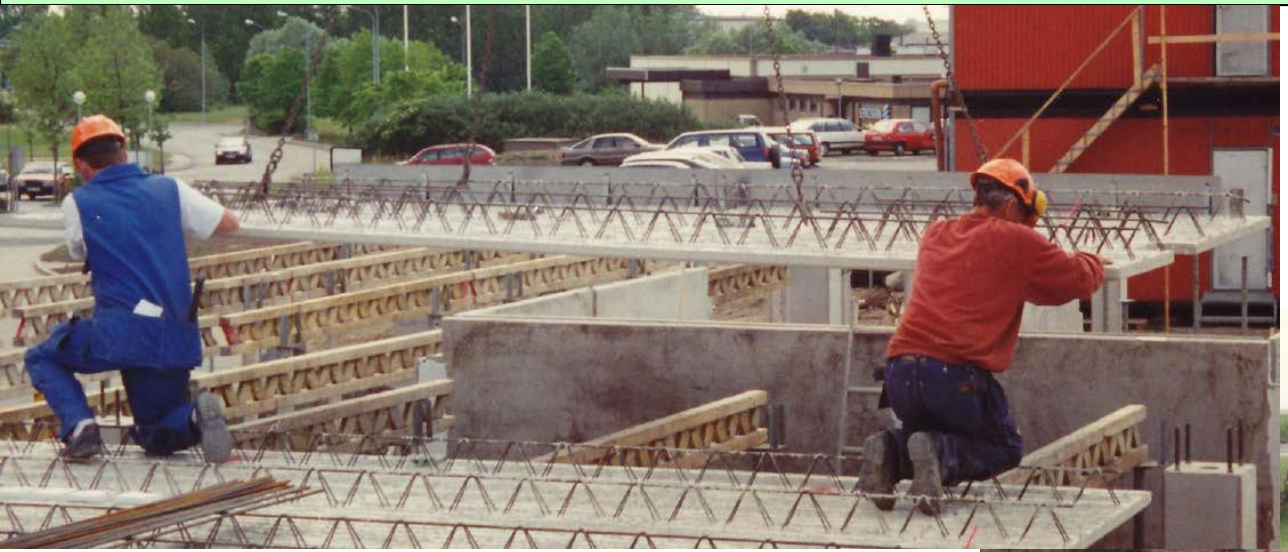
- the risk of strong wind requires striving continuously during mounting because the piston tripod support does not manage to take wind loads at height.
- that free-standing, open vault surfaces and shoring should be secured, from overturning due to wind, at work interruptions and when the work session ends.
- that in larger spaces, mounting and securing of stability should be carried out according to the construction process.

# Execution 3(13)

## Assembling formwork underside

# Execution 4(13)

## Installing filigree floor slab



Receive and install.

Disconnect.

Use fall protection harness!

# Execution 5(13)

## Installing filigree floor slab

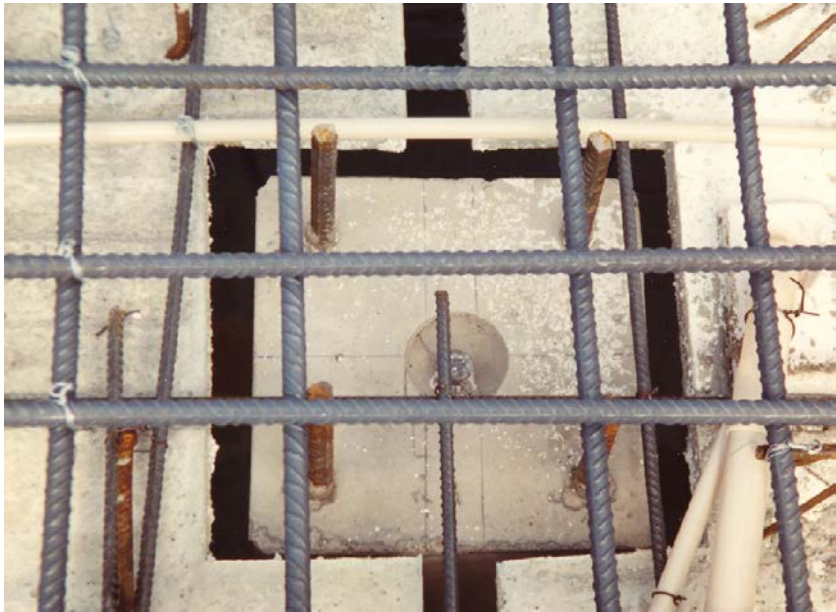
Here is being formed the bottom of a beam that will rest on the pillars.

Correct alignment of the columns

# Execution 6(13)

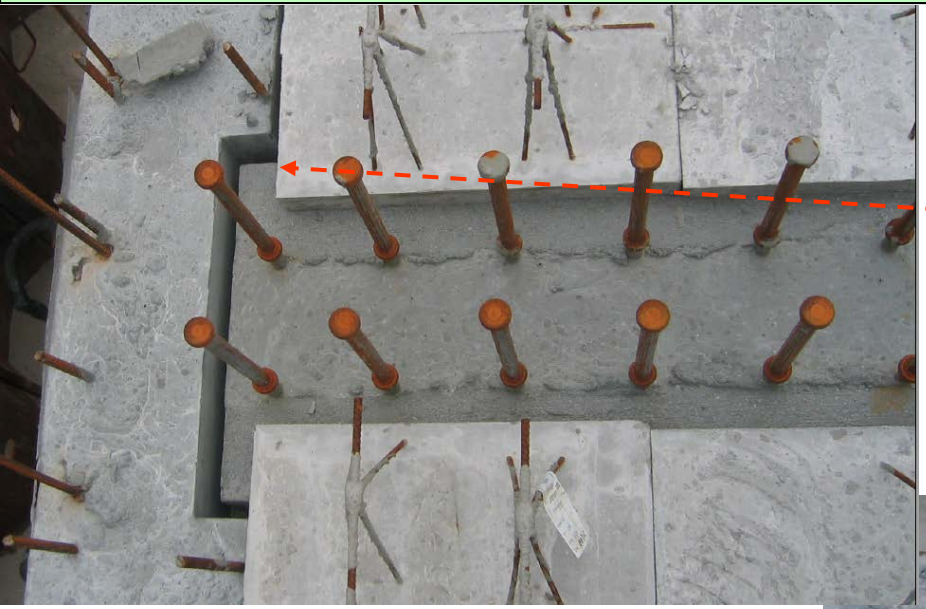
## Sealing of the floor slab

When the elements fit is not good sealing becomes necessary against adjoining structures.



# Execution 7(13)

## Sealing of the floor slab

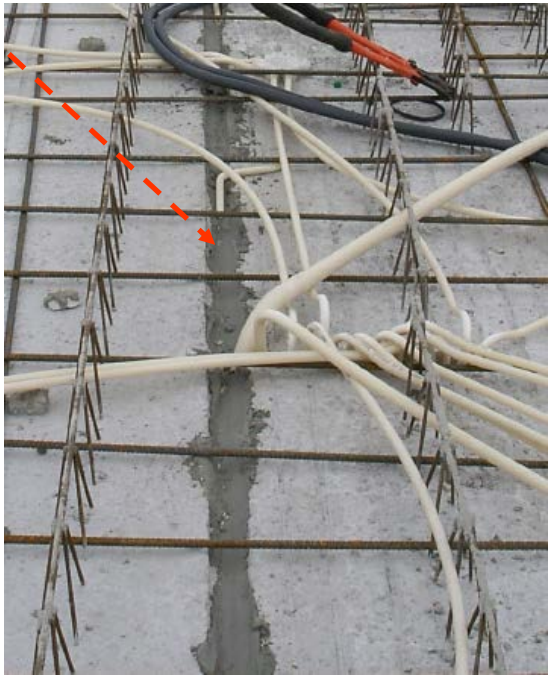


**Like a puzzle!**

The beam lies on the wall and the elements on the beam. Is sealing required?

Jointing before casting produces less
“burrs” between the floor and wall elements and round the steel columns.

Wheel barrow
with grout.



**The slab (and column) from above**

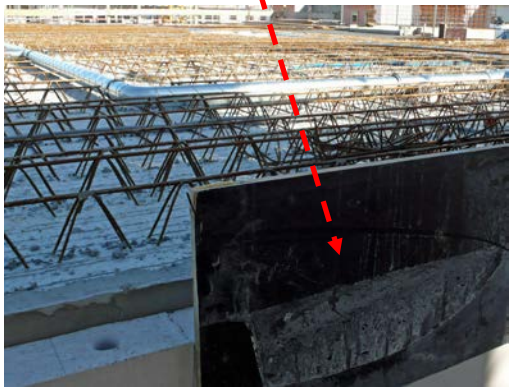
## Boundary (side) formwork

The shell walls stick up and operate as the boundary formwork during casting.

Assembled facade elements of lightweight concrete or sand-lime are extended to the level of the over side of the flat floor slab.

To cope with the pressure of the concrete during casting the side formwork has been secured with brackets into the flat floor slab

- to the right of the steel
- below of plywood



## Slab prepared for casting of concrete

During curing of concrete.

Safety shoring!

Here is being performed the dismantling of the formwork and removal using a truck.