

Installation of precast concrete balcony elements

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.

Safety — Risk assessment

Work activity: ReinfAssembly precast balcony elements

Work activity & Problem	P	C	Risk= P*C	Action
Crush injuries	3	70	210	Anchor/store in designated areas
Crane Working with the elements/crushing injuries	30	5	150	Education in crane directing/strapping
Falling material/crush injuries	10	15	150	Helmet compulsory
Fall from ladder fall injuries	10	15	150	Wider use of scaffolding
Cluttered workplace = Twist/fall injuries	10	15	150	Regular tidying

Probability = P
Consequence = C
Risk = P * C

Assessment of probability

P = 0,1	Very unlikely	(<1 times/10 years)
P = 1	Unlikely	(1 times/10 years)
P = 3	Low probability	(1 times/3 years)
P = 10	Relative probability	(1 times/year)
P = 30	Probable	(1 times/month)

Assessment of consequences

C=0,5	Trifle	
C=1	Tiny	(1 - 2 days sick leave)
C=5	Small	(3 - 7 days sick leave)
C=15	Tactile	(8 - 29 - " -)
C=70	Severe	(30-299 - " -)
C=500	Very severe	(>300 - " -)

Safety — Protective gear

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.

Fall Protection Harness

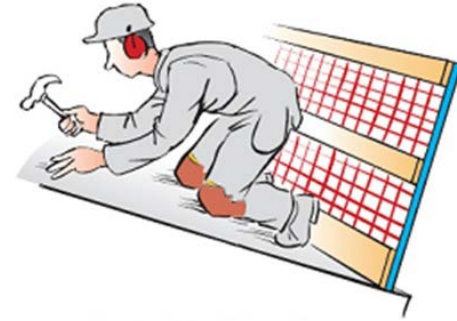
Sometimes safety harness are required with lanyard as protection instead of railing or other equipment.

In § 88 of the Regulations is set out how to determine which option to choose.

If personal fall protection equipment with rope is used, the rope should be attached to a suitable fixture on the roof, for example, a fixed protective device. If this is not possible to arrange a suitable person shall be appointed to hold the rope, preferably securing himself to a fixed object .

The cord is held taut during work activity. It is important to check that the brackets are trustworthy.

This also applies to permanent protective fixtures.



Guardrail at roofing works



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

Access routes § 63

For each location where work is performed safe means of access such as stairway or gangway shall be provided.

Ladders are usually not considered suitable as access routes.

Evacuation § 27-30

All workplaces should be capable of rapid evacuation in case of danger, such as fire. Everyone should be able to quickly and safely reach a place of safety. Especially arranged escape routes and assembly points shall be marked with signs.

Doors for evacuation shall be capable of being easily and instantaneously opened outwards in the escape direction.

Safety — Protective measures

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".



















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.



(See also AFS 2008:13, Appendix 3)

 <p>Hoist Load</p>	 <p>Lower Load</p>	 <p>Hoist Load Slowly</p>	 <p>Lower Load Slowly</p>	 <p>Stop</p>
 <p>Swing Boom in direction indicated</p>		 <p>Lower Boom</p>		 <p>Emergency Stop</p>
 <p>Extend Boom</p>	 <p>Retract Boom</p>	 <p>Raise Boom</p>	 <p>Lower Boom</p>	 <p>Signal not understood</p>
 <p>Open</p>	 <p>Close</p>	 <p>Main Hoist</p>	 <p>Auxiliary Hoist</p>	 <p>Finished</p>

Equipment and machinery

Tools and Equipment

- Tape measure or ruler
- Marker Pen
- Hammer
- Crow bar
- Pliers for tying wire
- Reinforcement bending stand
- Welding equipment

Materials

- “GNU space” on the underside of the joints of the floor slab/elements
- Sealing Tape
- Tie wire

- Cover Material/protection for the balcony's top surface
- Handrails

- Weldable reinforcing bars
- Welding Electrodes

Storage depots

As usual, the elements should be loaded so they can be released in the assembly sequence. Here they have been removed and placed in storage depots to get them in the right order.

The installation process takes time, so it might be good if the trailer with elements can stand on the site as a temporary storage depot.



Parape posts are mounted while the elements are on the ground.



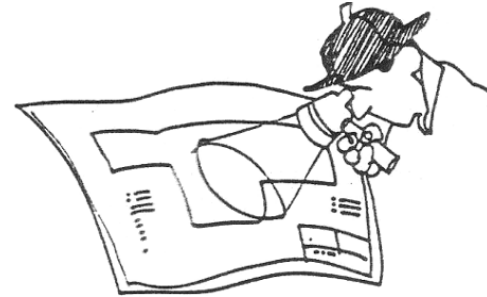
Self-inspection 1(2) Template & instructions

No	Check	Method or equipment	Frequency	Result	Date Signature	Deviation/Remedy Approval/Non-A
1	Assembly					
2	Surface camber with 1:100	Spirit level				
3	Sealing underside against concrete leakage	Foam strips				
4	Additional reinforcement					
5	Insulation					
6	Welding at fixation					
7	Protection of slab					
8						
9						
10						
11						

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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

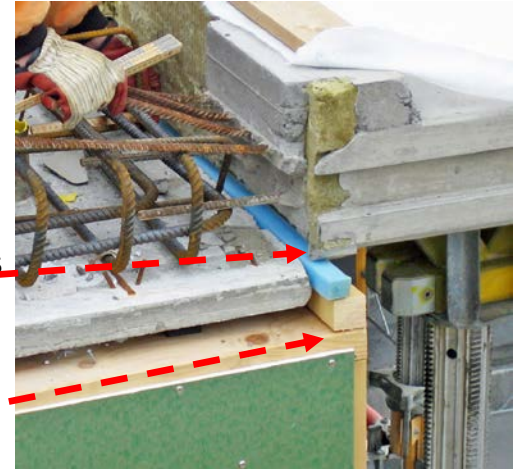
- check the location and orientation of the elements - the right elements in the right direction
- support and plumb elements
- do not install damaged elements



The elements are placed in the same way as flat slabs on shoring props and bending units.

A sealing strip (blue) is placed under the joints of the elements to prevent concrete leakage during casting.

A batten is fixed to support the outer gypsum panels.





Some rebar is bent into position with an reinforcement wrench.

Control of all dimensions.



Element in place lifting
chains can be released.

**NOTE! Good with
knee pads during
these operations**



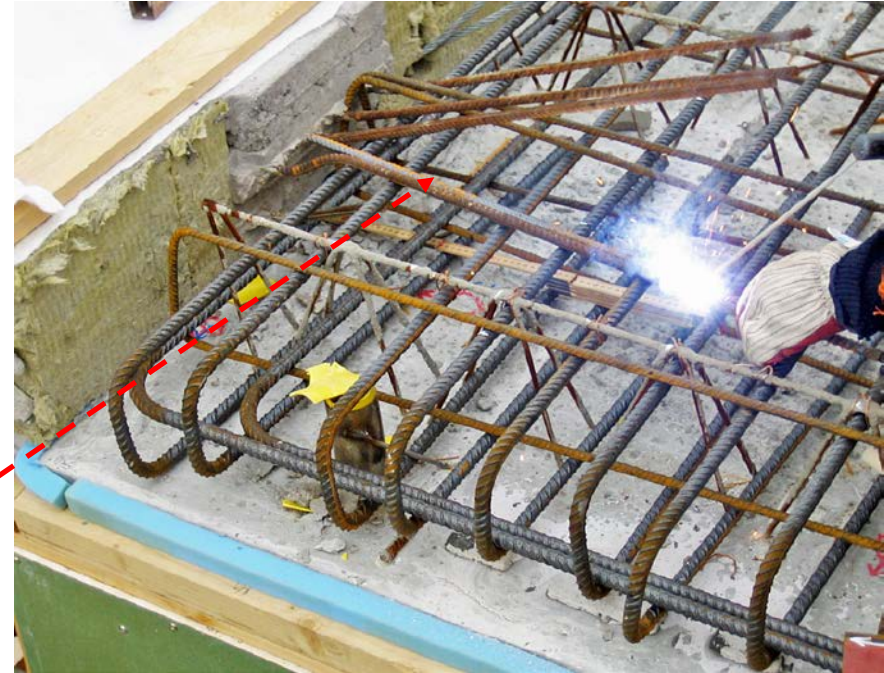
Fixing into position

Some rebar is welded in the slabs top reinforcement in order to allow the slab to be laid with a 1:100 camber.

During casting the bars tend to move a little.



Here an approximately 2 m long iron is being welded onto the high side reinforcement which then is also fastened together with a bar which is sitting in the balcony element.





Ready for casting

The elements have been well covered but the coverage has loosened a bit.

Guardrails are installed.