Mounting and Bonding 11 cm thick elements of lime sandstone

Compare with interior walls of plaster!

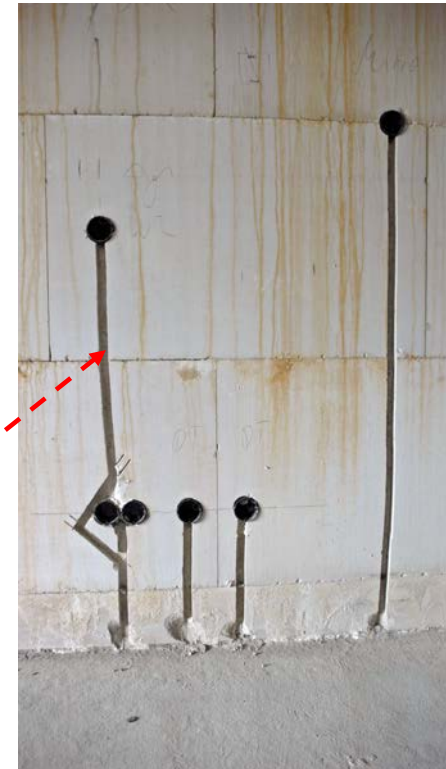
- Pre-conditions
- Preparation
- Self-inspection
- Execution

Lime sandstone blocks

Lime sandstone blocks is composed of sand, cement and water, and is therefore an environmentally friendly material.

The described method, of mounting large lime sandstone blocks of ½ m2, with adhesive, is common in Germany. When the compressive strength is about the same as for concrete, internal walls can be built up to several floors in height using these blocks.

The weight of the blocks means that transport costs are high - ie the distance from the factory sets a financial limit on its use. In Germany, Heidelberg has a large number of factories across the country.



Expenditure of time

Two fitters assemble approx 50 - 60 m2 of wall per day ie 0.27 h/m2 wall.
The dimensions of the current block is t = 115 mm and b X h: 998 x 498 mm.
This represents two blocks per m2 of wall.

Installations

Grooves for electrical wiring and boxes are milled and drilled into the elements.

Technical description of 'Lime Sand Stein'

Information is provided on http://www.heidelberger-kalksandstein.de/de.html

Work activity & Problem	P	C	Risk= P*C	Action
Overloading, stretching	3	70	210	
Crane Working with the elements, crush injuries	30	5	150	Education in crane directing and strapping
Falling material, crush injuries	10	15	150	Minimize crane movements with thoughtful depot localisation
Fall from ladder, fall injuries	10	15	150	Scaffolding and stairs
Fall injuries, sprain	10	15	150	Regular tidying

		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 from 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.

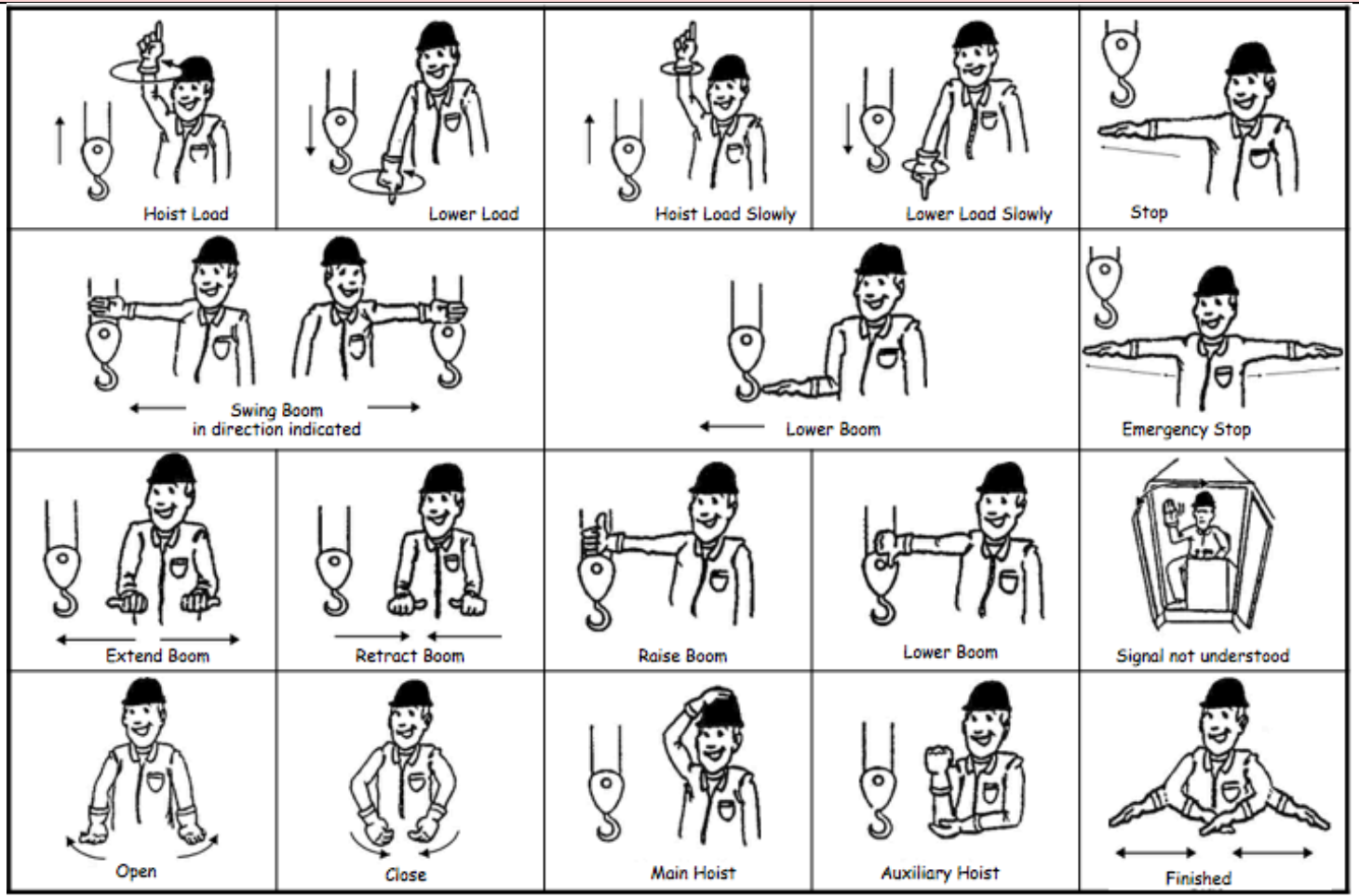
First Aid § 31

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 appropriately marked.
If such areas must be entered then canopy covered walkways or similar should be organized.


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

Tools and Equipment

- Smaller electrically-driven crane with lifting beam. Crane Basket for large crane element pallets.
- Mobile scaffold and ladder
- Stone splitter and/or masonry saw
- Screw ties for wall stabilization

<u>Hand Tools</u>

- Long and short spirit level, bricklayer’s string
- Adhesive 'agitator', mixing vessels, shovel, glue bucket
- Glue spreader (spade), trowel, mortarwater
- Bricklayer’s hammer, rubber mallet
- Climate protection/tarpaulins for protection of the works

Materials

- Lime sandstone blocks on pallets
- Glue in sacks
- Anchoring ties for walling

Glue-beater

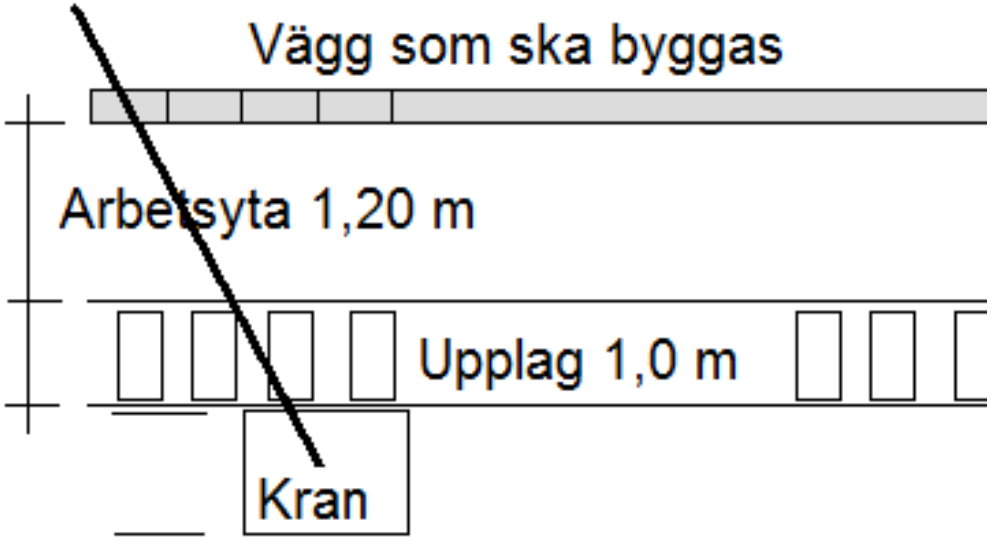
Masonry saw

Mini crane

Storages with piled stone blocks are placed so that the crane and rolling scaffold movement is not hindered. From wall to stockpile 1.20 m then stockpile every 1.0 m within the radius of the 'crane track'

The stockpile should be placed between 'crane track' and the wall to be built

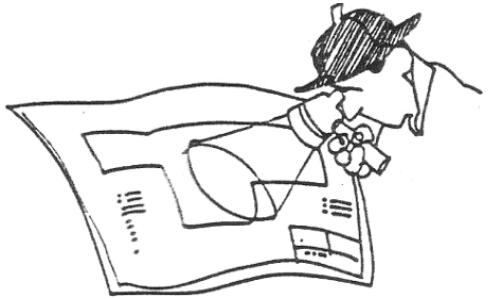
This avoids unnecessary crane swings



No	Check	Method or equipment	Frequency	Result	Date Signature	Deviation/Remedy Approval/Non-A
1	Check level and evenness (The blocks are in line)					
2	Necessary mounting hardware in place					
3	Setting out					
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

- Protect the wall's top surface and abutments to other building elements against both moisture and fast drying
- Mix the mortar according to manufacturer's instructions
- At temperatures below +5ºC , the masonry shall be protected

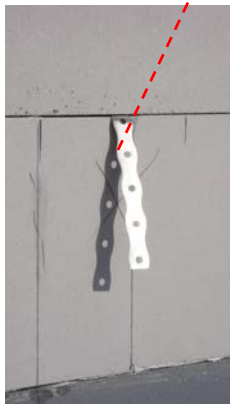
Setting out

The wall positions are marked on the floor slab.

The first shift is laid with adapted block height.

Note ties/recess brackets in the wall

Markings on the adjoining wall.



A block of ½ - m2 coupled with the lifting yoke/'tracking tool' through its cables being threaded holes in the blocks.

The small crane and lifting device is operated by a touch pad.

Element is lifted into place

Control of evenness and plumb + a blows with a rubber mallet to compress into the glue..

OK - the yoke releases

Finished walls
Strutting for thin shell is started.

Tracks are milled into the walls for electrical wiring and recesses are drilled for electrical boxes.
Refilling of recesses is achieved using gypsum plaster

Plan for heavy residues