Laying and welding of PP pipes

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.

Pre-conditions 1(3)

Safety — Risk assessment

Work activity: Laying sewage pipes and manholes

Work activity & Problem	P	C	Risk= P*C	Action
Falling material/crushing injuries	3	70	210	Inspection of lifting equipment Helmet compulsory
Cluttered workplace= strain/fall-injuries	10	15	150	Regular tidying
Excavation/shuttering, crushing injuries	30	5	150	Control of the shuttering
Deep excavations, poor air	3	15	45	Compressed air or similar

		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 - ” -)

Personal Protective Equipment § 71

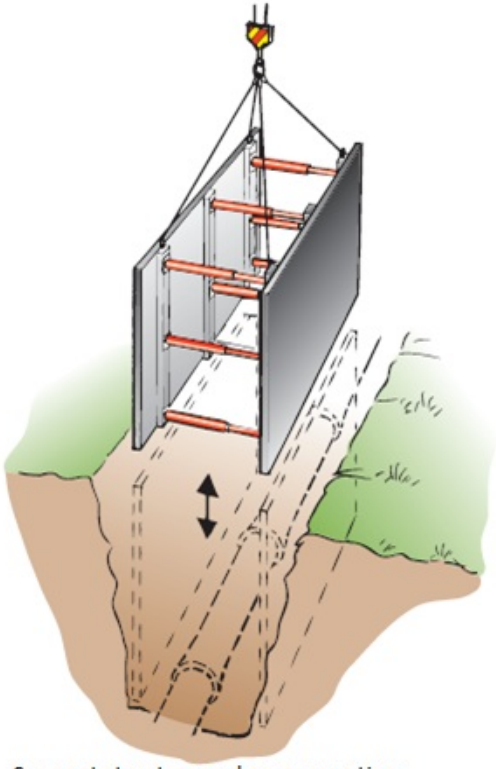
Safety helmet and safety shoes should be used unless it is clearly unnecessary. Other personal protective equipment such as eye and hearing protection and gloves should be worn wherever necessary.

Excavate safely

Earthworks should be planned and implemented so that the stability of the soil is sufficient with respect to the loads to which it is exposed.

Supporting structures such as sheet piling, shall be used unless the risk of a dangerous collapse is considered non-existent. Alternatively, the trench excavation should be carried out with inclined slopes. In both cases, the precautions against collapse, etc. shall be satisfactory. For example, vehicle shall be kept away from the edges of the excavation. Precautions must be taken so that excavation machinery does not fall into the pit.

Figure from the Working Environment Authority's brochure Safer Construction Work

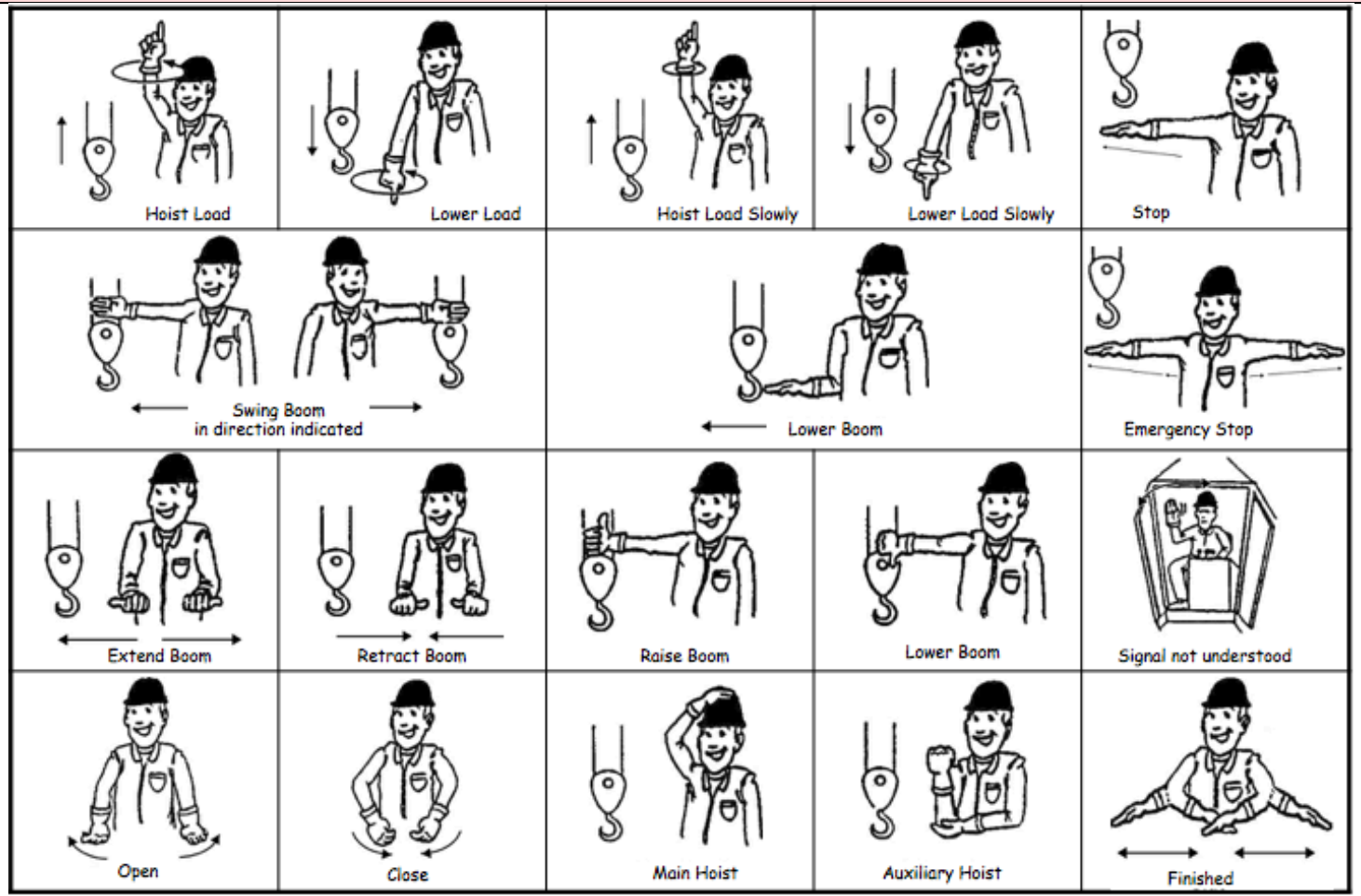


Support structures when excavating

Pre-conditions 3(3)

Crane directing

(See also AFS 2008:13, Appendix 3)



Preparations

- Check that the setting out data is available for each trench.
- The ”known” pipelines are confirmed by the pipeline owners.
- The areas that will be utilized for the work are inspected and available to permit performance of the work.
- The excavation permit under e.g. ”Excavation Requirements for *xxxxx* city” has been sought and received for work outside of the work area.
- The trees and other vegetation to be saved are protected in an appropriate manner and to the required traffic diversions are made.
- That the property owners are fully informed.
- The shutdown points for known pressure lines on the affected pipe stretch are known and that the appropriate Authorities are informed.
- Shutdown materials shall be available on site.

Equipment:

- ❑ Pipe Laser
- ❑ Roller/compactor
- ❑ Jointing tools
- ❑ Loader, Backhoe

Materials:

- ❑ Materials for pipe bedding and backfilling
- ❑ Plastic pipes and manholes
- ❑ Sealing caps/end caps

Material Depot – storage of pipes

The depots take up a lot of space.

End caps protect the pipes both against damage and against ingress of dirt.

No	Check	Method or equipment	Frequency	Result	Date Signature	Deviation/Remedy Approval/Non-A
1	Trench excavation according to working drawings					
2	Removal of existing pipelines					
3	Materials of the pipe bedding					
4	Pipe material to meet the specification					
5	Backfill: dimensions and consolidation					
6	Remaining filling					
7	Testing of the installation					
8	Inspection and cleaning of the pipeline					
9						
10						
11						

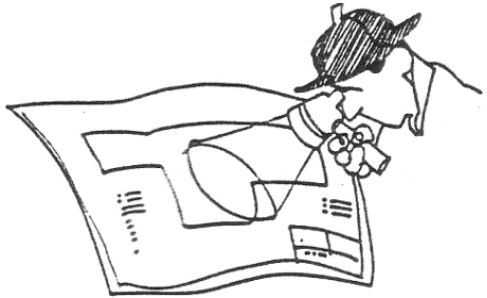
Self-inspection 2(3)

Items to check prior to start of pipelaying

Activity	**Regulatory Documents**	**Type/ frequency**	**Responsible Tradesman**	**Documentation**	**Comments:**
Trench excavation according to working drawing	Technical description CBB.3111	Ocular daily	Pipe-layer	Checklist	
Removing existing pipes	AMA CBB.3	Ocular daily	Pipe-layer	Checklist	
Materials in pipe bed	Technical description CEC.2111	Ocular daily	Pipe-layer	Checklist	
Cable Bedding shall not be packed	Technical description CEC.2111	Ocular daily	Pipe-layer	Checklist	
Pipe material shall meet the specification	Technical description PB	Entertainment control	Supervisor	Checklist / Acceptance inspection	
Backfill: materials, dimen-sions and consolidation	Technical description CEC.31	Ocular daily	Pipe-layer	Checklist	
Final backfill	CEC.4	Ocular daily	Pipe-layer	Checklist	
Piping height and position	Construction Documents, Technical Description YBC.343, 352	Daily	Mättekniker	Survey Protocol Gradient measurement	
Testing of the installation	Technical Description YBC .341, 343, 351	After completion of the installation	Foreman		

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

- cleaning the pipe inside and out before splicing
- ensure that the end caps are properly sealed
- splice piping according to the manufacturer’s instructions
- ensure that the pipes are in even gradient

Pipe bedding

Pipe bed formed with aggregate 0-40 with a thickness of 15 cm.
Pipe bedding must not be packed.

Pipe-laying

The pipes are laid using approved lifting equipment and joined using approved jointing tools.

For concrete pipes the rubber gaskets shall be checked that they are of the correct quality and that they are positioned correctly.

Manholes and inspection chambers and rain water pits shall be assembled using approved lifting plant.

The seal between the well sections shall be rubber rings.

Jointing

Jointing shall be performed using approved jointing tools.

1. The pipe ends shall be machined smooth
2. The pipe ends shall be controlled and brushed with glue

Jointing continued…

3. The ends are drawn together with jacks and “welded/heated” together – this takes some time

Insertion of the pipe

During the course of the work the pipe length will be inserted and controlled as to their horizontal and vertical position in order that positioning documents can be prepared. Chambers shall also be similarly measured.

Backfill

It is important that the pipe foundations are correctly performed.

The backfill of water and sewage pipes also embraces protection conduits. Backfill for concrete pipe DN < 400 mm dimension shall comprise aggregate not exceeding 65 mm in diameter.

For pipe dimensions greater than 400 mm a maximum aggregate size of 100 mm. Other related maximum stone size shall not exceed 32 mm. Backfill compaction is performed with vibrator and compactor.