

Transport and Storage Information – Box Culverts

Moore Concrete Box Culverts are designed by Chartered Structural Engineers in accordance with EN 1992 and BS EN 14844. Care must be taken during transport, offloading and installation to guarantee the integrity of the units.

The full design strength of the Box Culverts will only be achieved after **28 days**, the date of manufacture will be labelled on the unit. If this label is missing please contact Moore Concrete for advice. Unit weights are provided on the technical drawing supplied with the order acknowledgement.

Transport, Handling and Offloading

1. The customer is responsible for off loading Box Culverts and should:
 - Agree with Moore Concrete well in advance, the place and approximate time of delivery.
 - Provide a hard access which can be used safely by standard delivery vehicles.
 - Provide a suitable crane of adequate capacity.
2. Moore Concrete use spherical head anchors or threaded socket lifters to lift Box Culverts. The customer should:
 - Provide all handling equipment necessary to operate the lifting method on site.
 - Ensure that any non standard attachment to the lifting point is supplied and that full instructions are given for its use.
3. Where other methods, such as lifting forks, beams or slings are to be used the customer should:
 - Consult Moore Concrete to ensure that the proposed method is acceptable.
 - Protect the Box Culvert and particularly the joining surfaces from damage while lifting.
 - Ensure complete safety of operatives.
4. Generally Box Culverts are transported as laid, but for safety or economy, the Box Culverts may be transported on end. The customer should:
 - Check with Moore Concrete as to how the Box Culverts will be delivered.
 - Where Box Culverts are delivered on end, establish a safe method of turning.
 - Provide any equipment necessary for the operation.
5. The Box Culverts may be off loaded into a storage area or they may be placed in line alongside the trench in which they are to be laid. In either situation:
 - Before offloading, check the Box Culverts for any damage which may have occurred in transit and report any defects promptly to the supplier.
 - Lower them carefully on to a firm level base away from the edge of the trench.
 - Move them by lifting and never by dragging.
 - In cold weather, protect open lifting sockets from freezing and bursting.

Jointing Material

1. If the jointing material is not being supplied by Moore Concrete, it should be ordered in good time.
 - Establish the type of jointing material and whether any primer is necessary.
 - Measure the quantity required and allow for wastage.
 - Where seasonal grades are available, specify the grade required.
2. Damage to the profile of preformed jointing materials will impair efficiency.
 - Store cartons flat and protect from extremes of temperature.

- Stack to a limited height in order to avoid crushing.

Preparing the Trench

1. Keeping to the specified line and gradient, the trench should be excavated to a width equal to the Box Culvert width plus about 600mm for most conditions.
 - Keep the width to a minimum to avoid unnecessary excavation, bedding material and backfill.
 - Follow the normal requirements for safety when working in trenches.
2. Full load bearing capacity of an installed Box Culvert line is achieved with uniform support at the base.
 - Carefully trim the formation to the required depth and gradient making allowance for the thickness of the bedding.
 - Excavate local hard or soft areas of the trench bottom which may cause uneven settlement and replace with well compacted backfill selected to give uniform support.
 - Maintain a dry formation so far as possible by diverting water courses, pumping water from the trench or other means.
 - In clay soils, leave a protective layer of material in the trench bottom until just before the bedding is laid.

Bedding

1. Bedding is intended to level out any remaining irregularities in the trench bottom and ensure uniform support under the full width and length of the Box Culvert.
 - Lay well compacted selected granular material over the full width of the trench to a minimum depth of 200mm having first removed any protective layer.
 - Blind the surface with fine material to assist levelling.
2. Having achieved a flat, well prepared base, it should not be allowed to deteriorate.
 - Lay the bedding only a minimum distance ahead of the laying of Box Culverts.
 - Keep off the prepared base so far as practicable.
3. As an alternative to granular bedding, a concrete blinding layer is sometimes preferred to protect the formation or to allow faster laying of Box Culverts.
 - Lay a thin flat apron of unreinforced lean mix concrete about 75mm thick on a trench bottom which has been well prepared to a uniform firmness.

Applying the Jointing Material

- Joints may be left open in certain cases but a preformed strip compressed within the joint is commonly used. The strip should be applied to the Box Culvert just before it is laid in the trench.
- Where necessary, clean and prime the inner and sloping faces both spigot and socket and allow to dry.
 - Place the strip in the internal corner of the socket or where otherwise directed.
 - Cut mitred ends and join the strip at corners and do not bend the strip.
 - Check all the joints in the strip to ensure that the strip is continuous.
 - Always follow the recommendations of the manufacturer of the jointing material.

Laying the Box Culverts

A Box Culvert line is usually laid from the downstream end with sockets facing upstream to receive the next Box Culvert to be laid.

- Inspect the Box Culvert before laying to ensure that the jointing surfaces are clean and that no damage has occurred in handling and storage on site.
- Lower the Box Culvert carefully on to the prepared base aligning the spigot with the socket of the unit already laid.
- Prevent loose surface bedding material from entering the joint space during positioning of the unit by placing a hardboard strip beneath the base joint or by any other means.
- If any adjustment to level is necessary, remove the Box Culvert and adjust the surface level of the bedding.
- Do not use local packing to adjust the level.

Making the Joint

When a preformed strip is used, joints are closed by pulling against the Box Culverts previously laid.

- Anchor cables firmly at each end.
- Take on the crane the weight of the Box Culvert being jointed to reduce frictional resistance at the base of the Box Culverts.
- Allow for a load of approximately one ton per metre of strip to compress the strip.
- Apply heat, as recommended, to soften bitumen based strip when the weather is very cold.
- Close the joint with cable pullers to the specified nominal gap.
- On completion, make good any holes used for lifting and laying.

To provide an internal seal or to improve hydraulic flow, joints in Box Culverts of sufficient size for access may be pointed internally. This can take the form of an elastometric or bitumen based sealant or even a sand/cement mortar.

Backfilling

Backfilling should commence as soon as possible after the Box Culverts have been laid.

- Fill the trench to the level of the top of the Box Culvert working evenly on each side.
- Use selected backfill material well compacted in layers not exceeding 200mm.
- Do not use heavy vibratory equipment.
- Continue filling over the Box Culvert and compact in layers.
- Do not run heavy rollers or construction plant over the Box Culvert without protection.

Care must be taken since site traffic and construction equipment over shallow fill depths can impose loadings greater than those for which the finished Box Culvert has been designed. In such cases protective measures will be required.

The manufacturer assumes no liability for damage incurred by improper handling.

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