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Use of BSF, BCC in prestressed elements

Normally guiding pieces for the units will be attached to the mould side to secure the correct position of the column units. This necessitates that either the part of the form with the guiding pieces attached are removed perpendicular to the concrete surface. This is done if the guiding piece is fixed to the form.

Alternatively the connection between the form and the guiding piece can be disconnected. Then the concrete unit can be moved with the guiding piece still inside the BSF/ BCC unit. The guiding piece is removed from the BSF/ BCC unit after the unit is removed from the mould. These alternatives are illustrated in figure 29.1. The guiding piece is normally connected to the form by bolts through the mould, or by welding. The guiding pieces are normally made of steel or wood.

The lack of flexibility in the connection between the guiding piece and the form may create problems for prestressed pretensioned elements. The elements will tend to move relative to the form in the direction of the prestressing wires during the detensioning process (cutting or releasing the prestressing wires). The problem most commonly arises with prestressed columns. This must also be taken into account for prestressed beams with BSF/ BCC units on the side. The movement can be in both directions longitudinally, depending on the sequence of detensioning. This will require an extra control function in the detensioning procedure if the element only can move in one direction.

There are several ways to combat this problem.

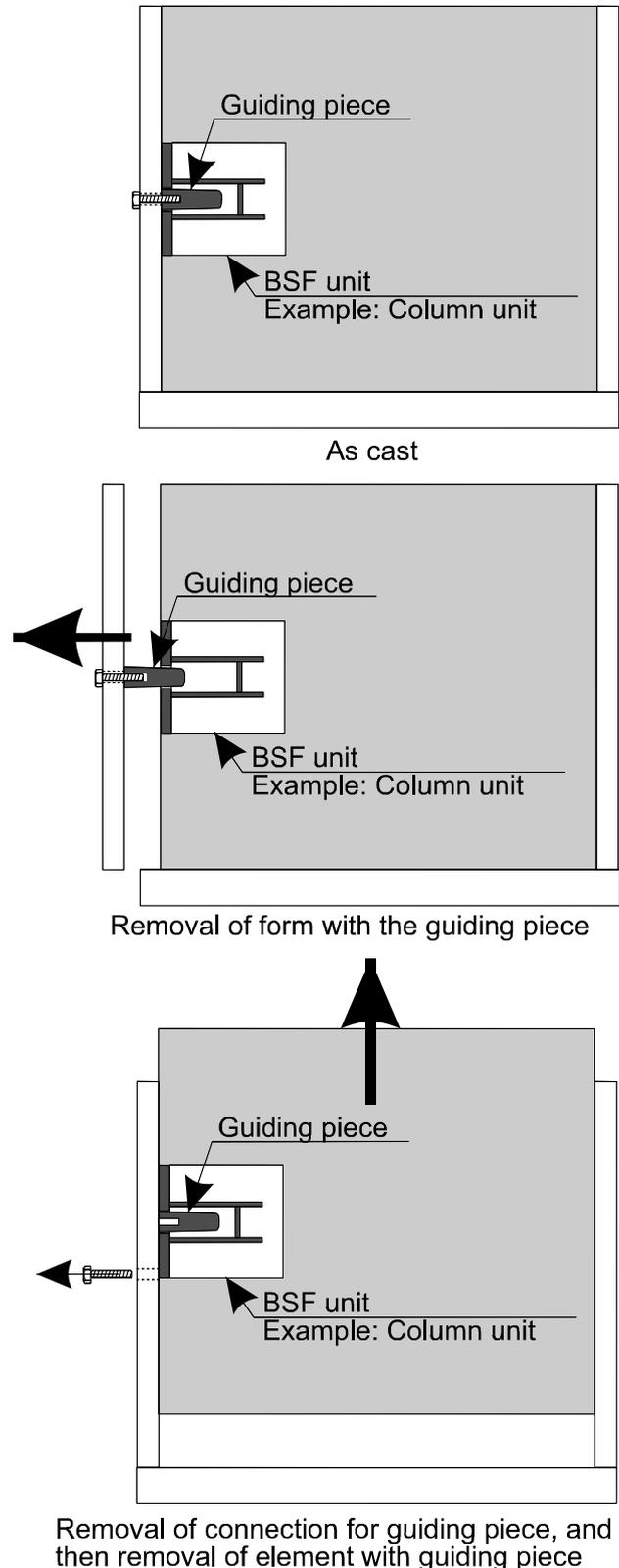


Figure 29.1. Illustration of demoulding methods.

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Method 1: The most obvious method is to use threaded bolts, as shown in the illustration in figure 29.1. The important thing to remember when this method is used, is to unscrew the bolts before detensioning. The disadvantage is that this method requires drilling of holes in the mould.

Method 2: Instead of steel bolts, plastic plugs with a diameter of 5 to 8 mm (3/16 to 5/16 inch) can be used. These plugs will be sufficient to keep the guiding piece in place during casting, but will break off during detensioning. This method is most relevant with wooden forms and guiding pieces.

Method 3: With steel forms and steel guiding pieces one may choose to use magnets to keep the guiding piece in its place in the form. Failures have been reported when this method is used. It boils down to finding the best magnet for the job.

Method 4 (For small movement during detensioning only): Make undersized guiding pieces of steel or wood. Then glue rubber to it on both ends, as shown in figure 29.2. The rubber must be stiff enough to keep the BSF/ BCC units in place during casting, and soft enough to allow for some movement of the element without damaging the element or the form. A hardness of about 40 shore may be suitable. The center part of the guiding piece can be bolted, welded or nailed to the form. After detensioning the form must be removed perpendicular to the concrete surface.

Note: The stiffness of rubber is not completely described by the hardness alone, it will also depend upon the form factor and cellular structure. The selected product should be tested.

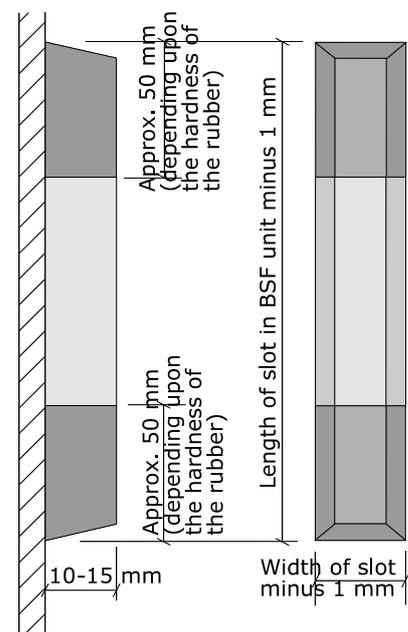


Figure 29.2. Rubber padded guiding piece.

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Method 5 (For small movement during detensioning only): The guiding piece it can be split, and the two parts connected with steering rods, and kept apart with a spring, as shown in figure 29.3. The part that is connected to the form can be attached with bolts, welding or nailing. After detensioning the form must be removed perpendicular to the concrete surface. The disadvantage with this solution is that an extra control function in the detensioning procedure is required to make sure the element will move in the required direction.

Method 6: Avoid using the guiding piece by attaching the BSF units to the reinforcement cage, and secure the location of the reinforcement cage. Do not connect the BSF/ BCC unit to the form at all. This puts great demands on the workmanship in the plant, but has been used successfully. One producer uses this method.

Note: Remember to seal the opening between the BSF/ BCC unit and the form, with silicone o.e.

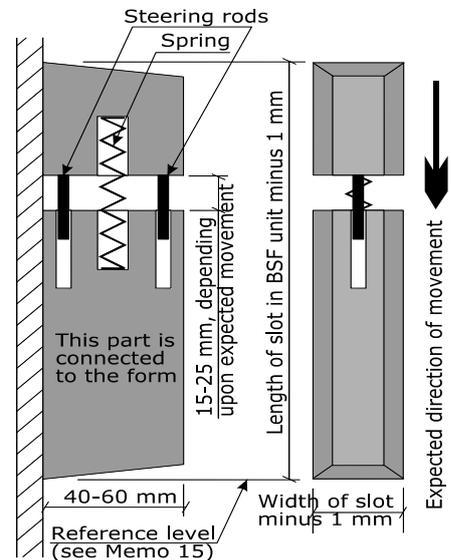


Figure 29.3. Compressible guiding piece.