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1 Stationary Placing Boom:

1.1 General

The limits of concrete placement continuously expand with the application of a Schwing concrete pump and placing boom combination. Now imagine where you want the concrete to be placed...at what rate... and let the Schwing product specialists plan a distribution system with the site manager.

The possibilities are endless with the various booms sizes available, the mounting options and the number and sizes of booms that can be engineered into a project. The net result is systematic concrete placement you can count on while increasing placement rates by as much as 50-percent over other methods.

Labour requirements are minimal – one person operates the placing boom for uniform concrete placement in wall, column and deck forms – less raking and finishing time is required because of the precise placement. Continuous flow also results in higher quality concrete.

Added time savings are realized by the tower crane being free to handle other lifting operations.

Years ago already the trend to rationalization and short completion periods led to the use of placing booms for the construction of large-scale buildings. Based on the experience in the manufacture of concrete placing equipment, SCHWING was able to offer their trendsetting equipment at a very early stage. As far back as in 1969 where the first SCHWING separate placing boom was put into operation by Ph. Holzmann in the joint venture Asenwald Stuttgart.

The experience gained through all these years on a great number of construction sites all over the world enabled SCHWING consulting engineers gain the experience to offer the optimum concrete placing method for every site.

One way to place concrete quickly and economically is the use of separate placing booms in conjunction with efficient concrete pumps. The placing booms with the designation SPB and those of truck-mounted concrete pumps are of equal design. That is why the placing booms SPB 30 through SPB 35 can be used for stationary as well as on truck mounted pumps.
1.2 Installation method

Free standing up to 20 m

Through the floor slabs

Directly on cross frame
1.3 **Technical data and options**

Boom of stable box-type construction, 4-stage hydraulic folding in vertical plane with attached pipeline, pivoted on a swivelling slewing column, operation of the boom by means of hand levers or installed electric remote control cable, end hose and connecting line for connection to the delivery pipeline. Trestle-pin connection for quick separation when repositioning the placing boom. First boom section with pin joint.

Powering of the hydraulic pump for hydraulic actuation of all boom movements is made by an electric motor. The complete power unit including the hydraulic tank and control box is installed near the pedestal.
1.3.1 SPB 25 (Split boom)

**Technical data**

Dia. of pipeline  
DN 125

Horizontal reach from centre of rotating axis, max.  
25 m

Slewing range folding  
530°

Length of end hose  
4 m

Electric engine power 400 V, 50 cps, protection mode IP 44  
22 kW

**Total weight of the boom**  
5970 Kg

with hydraulic oil, with pin connection on main boom to reduce handling weight.

1.3.2 SPB 28 (Split boom)

**Technical data**

Dia. of pipeline  
DN 125

Horizontal reach from centre of rotating axis, max.  
28 m

Slewing range folding  
530°

Length of end hose  
4 m

Electric engine power 400 V, 50 cps, protection mode IP 44  
30 kW

**Total weight of the boom**  
6380 Kg

with hydraulic oil, with pin connection on main boom to reduce handling weight.

1.3.3 SPB 32 (Split boom)

**Technical data**

Dia. of pipeline  
DN 125

Horizontal reach from centre of rotating axis, max.  
30 m

Slewing range folding  
530°

Length of end hose  
4 m

Electric engine power 400 V, 50 cps, protection mode IP 44  
30 kW

**Total weight of the boom**  
7100 Kg

with hydraulic oil, with pin connection on main boom to reduce handling weight.
1.3.4 SPB 35 (Split boom)

Technical data

Dia. of pipeline DN 125
Horizontal reach from centre of rotating axis, max. 35 m
Slewing range folding 530°
Length of end hose 4 m
Electric engine power 400 V, 50 cps, protection mode IP 44 30 kW

Total weight of the boom 8350 Kg
with hydraulic oil, with pin connection on main boom to reduce handling weight.

2 Accessories

Supplemental Equipment for Concrete Placing Boom

1x Tubular head part (638 Kg for SPB 28 and 32 / 849 Kg for SPB 35)
2m with integrated flanges.

3x Tubular segments (1450 Kg each segment)
Consisting of 3 segments each 6m Octagunal column
Total height: approx. 20 m
With the following methods of fixture:
A: Free standing
   20 m max. on cross frame
B: Climbing through a building:
   with openings of about 1045 mm X 1045 mm in each floor.
To be fixed 2-3 floors slabs (depending on the floor height) to ensure the requested stability. The boom can be mounted on a 20 m column inside the building with a max. free standing height of 15 m above the last floor frame.

1x Hydraulic climbing device (75 Kg each cylinder)
for automatic lifting of the tubular mast and placing boom, consisting of:
1 set climbing cylinders actuated by means of a hand lever at the control block or via remote control - push button and approx. 15 m cable, suspensions with socket pins.

3x floor frames (272 Kg each)
with 2 each eccentric pins and guide rollers, 2 small cross bolt + 8 wedges

1x Cross frame (755 Kg)
1x Working platform (386 Kg)
to facilitate the assembly and operation of the equipment. The platform can be reached via ladders.

3x Ladder section, 4 m long (43 kg)
with back protection

3 Climbing procedure

During the climbing operations, the boom column must be guided and supported by three climbing guide frames. These frames transfer the occurring forces into the concrete structure and maintain the stability (Fig. 1).

The climbing equipment is always installed on the lowermost climbing frame.

1. Attach the lifting arms 2 to both climbing cylinders 4 (Fig. 2) and secure the pins 3.
2. Place the climbing cylinders on the supports of the lowermost guide frame (Fig. 1), insert the lifting pins 1 in position "A" and secure. In this position, the climbing cylinders can be extended and retracted without the boom column being lifted (for bleeding).

3. Extend the climbing cylinders slowly to the limit top. The boom column and the placing boom are raised in the process.

4. When the climbing cylinders are fully extended, insert a supporting pin 1 (Fig. 2) on both sides above the guide frame.

5. The safety latches 2 (Fig. 2) of the supporting pins must be inserted into the next higher bore of the boom column – Relieve the climbing cylinders by retracting them slowly a short distance. The load of the boom column and the placing boom is now borne by the supporting pins.

6. Retract the climbing cylinders completely (Fig. 3).

7. Withdraw the lifting pins and insert into the next hole (Fig. 3).

8. The next lifting procedure can now be started.

9. Repeat these steps until the boom column has reached the desired height.
Attention:

To maintain stability, the boom column may be raised only to such an extent that its lower edge is still 1.50 m away from the lowermost climbing guide frame (Fig. 1).

RISK OF ACCIDENT

The boom column and the placing boom may topple over.

Lift the boom column out of the lowermost guide frame only after having installed a third climbing guide frame at the top.

When this position is reached, the climbing equipment and the climbing guide frame must be relocated (Fig. 1) if climbing is to continue.

To do so:
– Move the climbing equipment to the next higher floor and install
– Dismantle the lowermost climbing guide frame and move it up to the highest floor. Refit the frame there.
– When the desired height is reached, secure the boom column with wedges. To secure, drive eight wedges 1 (Fig. 1 and Fig. 2) into the guides of the upper frame and eight wedges into the guides of the lower frame (arrows, Fig. 1).

Attention:

For static reasons, no wedges must be driven in at the middle guide frame.
4 Assembly instructions

The information contained in this document is an aid only and in no way replaces the operation instructions and safety manuals.

4.1.1 General points to consider when using placing booms

1. The placing boom is used on a site to relieve the crane from concreting operations.
2. Consideration must be given to the time the installation of the boom requires.
3. Full supervision must be given during the operations; the supervisor must be experienced in the task.
4. Full and complete check systems need to be used to monitor the installation and commissioning of the machine.
5. Operators must be trained to maintain the equipment to a reasonable standard.
6. Attention must be paid to the condition of the machine while on site, it must be inspected regularly by a competent person and a report placed in the safety file.
7. The site electrician should inspect, on a regular basis, the power cable and installed sockets, at both the control panel on the boom and the circuit breaker at the mains supply.
8. If the boom is to be used on its own generator, the recommended size to use is 75kVA.
9. On a SPB32 placing boom, the 22kW electric motor requires a start up current of 84 Amps and a running current of 42 Amps.
10. Safety is paramount and to this end all assembly personnel need to be trained and certified in the safe and correct installation of placing booms.
11. Cleaning out of the boom should be considered and the use of the water wash out system is recommended. This is cost effective and the concrete in the line is pumped to the placing point and with continued practice this system is safer.
4.1.2 Safety aspects

When assembling the Schwing separate placing boom system on the octagonal column accessories, it needs to be recognised that although the system is designed to be simple to use, the components are of a robust construction and as such are heavy to handle. A dedicated crane is required for the initial installation. When these operations are carried out on a site all of the site management needs to be made aware of the cranes intensive use during the erection.

A banks man must be with the assembly team at all times. It must be realised that for ease of assembly all the components must be slung level, trying to force the items together is tiring, awkward and with the close proximity of operatives’ hands to the connection points, failure to sling items correctly will create a hazard.

The working area needs to be properly cordoned off and clear of any trip hazards. It needs to be of sufficient size to allow ease of access and egress for the assembly personnel.

Every operative must wear the required PPE and safety harnesses and fall arrest equipment must be supplied to those who will be climbing the mast to carry out final connection.

Precaution should be taken regarding tools that have to be used on the working platform of the mast, the ladders have safety hoops attached restricting the person on the ladder from being able to carry any bulky items.

A simple idea is to have rope hanging from the working platform hand rail, (this should only be during installation) and a tool bag that can be closed, hence the tools once in the bag are then fastened to the rope and hoisted to the work area. When used with a heavy duty cross frame, the holding down bolts must be M36 diameter and of 8.8 grade. Schwing can give the correct tensile and compressive loads and it is then up to the bolt supplier to give the correct torque settings for these bolts.
The construction bolts in the mast section, are M36 x 360 cap screws and be of 10.9 grade. The torque for these bolts is according to drawing No.10216625. Correct pipe clamps are to be used to attach the delivery line and plastic support plates are also required where the delivery line is attached to the ladder brackets. Safety clips must be fitted to all pipe clamps and where required “R” clips must be in place (such as the working platform mounting points).

To join the column sections together, initially the “Top” section of mast has to be “packed up” level and the next section suspended from the crane, for this operation some form of support, of sufficient capacity, is required.

Total lifting weight of the column assembly complete with 3 No. 6m sections, top section, working platform, ladders with back rests and the concrete delivery pipeline is approximately 5,500 kg. A crane of sufficient capacity is required for the operation of lifting the column on top of the heavy duty cross frame.

Otherwise, the column must be assembled on top of the heavy duty cross frame, one piece at a time. For this method of assembly, a form of access platform is required for the assembly operatives to work safely at 6m, 14, and at 20m height. The total lifting weight of the boom assembly is 6,400 kg and if the site does not have the tower crane, which could not lift the boom in one piece, it can be split into "turret section" and "boom packet". The weights of the split sections are 2,600kg and 3,800 kg respectively.

THE OPERATION OF INSTALLING A “SCHWING” PLACING BOOM REQUIRES THE CRANE TO BE MADE AVAILABLE WHEN THE ASSEMBLY TEAM IS READY TO CARRY OUT THE INDIVIDUAL OPERATIONS. TRYING TO CARRY ON WITH NORMAL SITE MOVEMENTS AND “FIT IN” THE TASKS REQUIRED FOR ASSEMBLY, NOT ONLY LEADS TO DELAYED AVAILABILITY OF THE BOOM, BUT ALSO THE POSSIBILITY OF MISTAKES OCCURING BECAUSE OF LONG DELAYS BETWEEN OPERATIONS.
### 4.1.3 **TOOLS REQUIRED FOR ASSEMBLY**

VARIATIONS / COMBINATIONS OF SPANNERS, RATCHETS AND AIR POWERED TOOLS ARE REQUIRED.

1. **NUT / BOLT HEAD SIZES ARE :-**
   - M27 ALLEN KEY FOR MAST CONSTRUCTION BOLTS.
   - 36mm SPANNER OR SOCKET FOR THE NUTS.
   - 24mm SPANNER FOR THE NUTS ON THE LADDER HOOPS AND THE DELIVERY PIPE SUPPORT CLAMPS.
2. **17mm AND 19mm SPANNERS/ SOCKETS FOR THE FIXINGS ON THE WORKING PLATFORM AND TRAP DOOR ASSEMBLY.**
3. **HAMMER FOR DRIVING IN / OUT THE CONNECTION PINS ON THE BOOM TO MAST CONNECTION OR THE BOOM ARM TO TURRET CONNECTION.**
4. **HYDRAULIC TORQUE WRENCH TO TORQUE THE CONSTRUCTION BOLTS HOLDING THE FLANGES OF THE MAST SECTIONS.**
5. **PAINT BRUSH FOR APPLYING GREASE TO CONNECTION PINS/ POINTS.**
6. **55mm SOCKET/ SPANNER FOR NUTS ON HOLDING DOWN BOLTS.**

**THIS LIST IS FOR USE ONLY AS A GUIDELINE AND IS BASED ON THE FIXINGS PROVIDED WITH “SCHWING” STANDARD SCOPE OF SUPPLY. IF OTHER SUPPLIERS OF FIXINGS HAVE BEEN USED SEEK THEIR ADVICE ASTO TOOL REQUIREMENTS.**
5 Working range

5.1.1 SPB 25
5.1.2 SPB 28
5.1.3 SPB 32
5.1.4 SPB 35
6 Examples for load drawings

Please note that in case of other dimensions on site, new Load calculations have to be made and adapted to the real situation on site.
6.1.1 SPB 25 in slab distance 3m (no counterweight)

<table>
<thead>
<tr>
<th>No</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head section</td>
</tr>
<tr>
<td>3</td>
<td>5m column</td>
</tr>
<tr>
<td>6</td>
<td>4m column</td>
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<table>
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<tr>
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<th>windforce kN/m²</th>
<th>moment kN/m</th>
<th>vertical load kN</th>
<th>horizontal loads kN</th>
<th>windloads kN</th>
<th>torque kNm</th>
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<tr>
<td>X, in operation</td>
<td>0.3</td>
<td>622.2</td>
<td>150.0</td>
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<td>207.4</td>
<td>5.9</td>
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<td>Y, in operation</td>
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<td>575.3</td>
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<td>192.1</td>
<td>5.0</td>
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<td>X, out of operation</td>
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<td>137.9</td>
<td>116.3</td>
<td>21.6</td>
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<tr>
<td>Y, out of operation</td>
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<td>404.7</td>
<td>130.2</td>
<td>158.6</td>
<td>134.9</td>
<td>33.7</td>
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</table>

with quick connection on boom 1
6.1.2 SPB 28 freestanding with 18m column (no counterweight)

SPB 28 / EU

Working range in operation 360°
with quick connection on boom 1

<table>
<thead>
<tr>
<th>No</th>
<th>Component</th>
<th>Head section</th>
<th>V / KNm</th>
<th>vertical load</th>
<th>forces</th>
<th>windloads</th>
<th>torque</th>
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<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
</tr>
<tr>
<td>2</td>
<td>4m column</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
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<tr>
<td>3</td>
<td>crossframe</td>
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<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
<td>V / KNm</td>
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<table>
<thead>
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<th>windforce</th>
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<th>windloads</th>
<th>torque</th>
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<td>139.7</td>
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6.1.3 SPB 28 freestanding with 18m column (with counterweight)

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<td></td>
</tr>
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Working range in operation 360° with quick connection on boom 1 / with counterweight

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<th>wind direction</th>
<th>wind load/kNm²</th>
<th>moment (kNm)</th>
<th>vertical load (kN)</th>
<th>force (kN)</th>
<th>wind load/kN</th>
<th>force (kN)</th>
<th>moment (kNm)</th>
<th>force (kN)</th>
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<td>211.1</td>
<td>203.2</td>
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<td>36.8</td>
<td>21.9</td>
<td>13.3</td>
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<td>262.2</td>
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<td>46.2</td>
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</table>
6.1.4 SPB 28 in slab distance 3.2m (no counterweight)

![Diagram of SPB 28 / EU](image)

Working range in operation 360° with quick connection on boom 1

<table>
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<th>No</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>head section</td>
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<tr>
<td>3</td>
<td>6m column</td>
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<td>0</td>
<td>4m column</td>
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<p>| wind- | windforce | moment | vertical load | horizontal loads | windloads | torque |</p>
<table>
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<tr>
<th>direction</th>
<th>kN/m²</th>
<th>kNm</th>
<th>kN</th>
<th>kN</th>
<th>kN</th>
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<th>kNm</th>
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<td>180.8</td>
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</table>
6.1.5 SPB 32 in slab distance 4.0m (no counterweight)

The diagram shows the SPB 32 setup with the working range in operation 360° with quick connection on boom 1.

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<th>Component</th>
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<table>
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<th>wind-</th>
<th>windforce</th>
<th>moment</th>
<th>vertical load</th>
<th>horizontal loads</th>
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<th>torque</th>
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<td>kN/m²</td>
<td>kNm</td>
<td>V / kN</td>
<td>Hu / kN</td>
<td>W / kN</td>
<td>Md / kNm</td>
</tr>
<tr>
<td>in operation Y</td>
<td>6,3</td>
<td>868,0</td>
<td>127,9</td>
<td>222,2</td>
<td>3,1</td>
<td>58,0</td>
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<tr>
<td>in operation Y</td>
<td>6,3</td>
<td>868,0</td>
<td>127,9</td>
<td>222,2</td>
<td>3,1</td>
<td>58,0</td>
</tr>
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<td>190,7</td>
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<td>1,1</td>
<td>244,0</td>
<td>190,7</td>
<td>84,6</td>
<td>23,4</td>
<td>50,2</td>
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</tbody>
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6.1.6 SPB 35 in slab distance 4.5m (no counterweight)

<table>
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<th>No</th>
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<td>1</td>
<td>head section</td>
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<tr>
<td>3</td>
<td>6m column</td>
</tr>
<tr>
<td>0</td>
<td>4m column</td>
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working range in operation 360°
with quick connection on boom 1

<table>
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<tr>
<th>wind-force</th>
<th>wind direction</th>
<th>moment Me / kNm</th>
<th>vertical load V / kN</th>
<th>horizontal load Hu / kN</th>
<th>wind load W / kN</th>
<th>torque Md / kNm</th>
</tr>
</thead>
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<tr>
<td>0.3</td>
<td>X</td>
<td>1046.8</td>
<td>177.8</td>
<td>238.2</td>
<td>224.0</td>
<td>8.2</td>
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<tr>
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<td>Y</td>
<td>1660.1</td>
<td>177.8</td>
<td>232.2</td>
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<td>X</td>
<td>454.0</td>
<td>154.0</td>
<td>123.7</td>
<td>101.1</td>
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<tr>
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<td>Y</td>
<td>478.5</td>
<td>154.0</td>
<td>144.1</td>
<td>106.3</td>
<td>37.7</td>
</tr>
</tbody>
</table>
Solutions for concrete