17. Slab rebar arrangement

1) Slab rebar arrangement

(1) Slab type classification
- 2-way slab rebar arrangement method
  (ly < 2lx Type)

(2) Slab main bar arrangement type classification
- Bent bar type
  - Union type of outer beam and slab

- Union type of outer wall and slab

apply A class splice of tension bar if upper part bar tying on
location (apply B class splice of tension bar on the rest location)
⑤ Cut bar type

- Union type of outer beam and slab

- Union type of outer wall and slab
③ Rebar arrangement details of slab stepped pulley

(a) In case $H < 75\text{mm}$ or $\frac{t}{4}$

(b) In case $\frac{t}{4} < H < t$ and $H < 150$

(c) In case $t < H < 2t$

※ In case $H > 2t$, consult with structure planner.
※ In case there are stepped pulley on slab center part, you should fix by using $90^\circ$ standard hook for slab lower part rebar.

④ Slab and wall union details
⑤ Tolerance range of slab, beam, pillar, wall rebar arrangement

① Allow to ±6mm as tolerance of D in case under 600mm of slab, beam, pillar, wall.
Allow to ±10mm as tolerance of D in case over 600mm of slab, beam, pillar, wall.
⑥ Allow to ±50mm as tolerance in case bent point or end point of length direction rebar (but, except for end of concrete)
⑦ Big bar of pillar and stirrup of beam can get the space till 0~6mm as space length from main bar
2) Principle of rebar arrangement

① The worker measures the real length between beams and arranges the reinforcement bars consulting the drawing, main bars in the short direction and sub. bars in the long direction.

② Bent bars at the top should be extended into the exterior beam reinforcement, and be sure for the bars at the top and bottom to be hooked and tied considering tensile and compressive force to slabs.
It is not allowed if you put on slab upper part rebar as it is or put into the beam under 10D of rebar thickness of lower part rebar.
Slab bar arranges over 80mm space from side of beam bar. (There are no need to fixing by bending if you can get fixed length from end of beam)

※ The arrangement in slabs should be in accordance with the drawing and be sure not to bend if it is a web reinforcement.

③ It is quite advised to use spacer and bar support to keep the required shape and strength, and tie the reinforcement every other grid.
The placement of concrete should be conducted after all the reinforcements and ties are assured.

④ In case the thickness of slab is 120mm, the height of bent bar should be 60mm.
Use bar support in order to maintain the space between bars at the top and bottom and then the distance will be correct.
Lower part bar will be worked by maintaining cover with spacer.

⑤ Tie the bars at the top and the bottom irrespectively.
Tying the bars is conducted in alternate and do not let the tying positions coincide with each other, so that the bars at the top sustains upper loads and the bars at the bottom handles undesirable loads.
3) Calculation of slab plate

It is wrong method in case you cut the length of cut bar (top point) in advance by calculating $\frac{1}{4}$ point from center to center of beam.

Therefore, you determine the end by calculating $\frac{1}{4}$ as the criterion of short LX from the rest plate by deducting both width parts.

※ When bending in slab, using the hunch former will enhance the accuracy and workability.

Hunch former can be made with bars on construction site.

If the bar is bent with hands, the length and the height of hunch will different whenever it is made.

Please work with hunch former because bent bar decline to left/right side if you bending too slantly to fit the height with hunch angle 45°.
4) Sequence of slab rebar arrangement

In slab arrangement, bent bar should arrange (bend on return bend point) by above procedure. But total length is not fit by coming inside as diagonal length to bend after assembling upper part bar, lower part bar completely when using arrangement method on construction site regularly.

In formal rebar arrangement, it consists of main bar, sub bar(upper part 2 layer, lower part 2 layer). But it has difficulty in maintaining rebar up/down distance by folding top sub bar over main bar and sub bar(upper part 3 layer, lower part 3 layer).

※ Phenomenon in case there are no formal arrangement of slab

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② In formal rebar arrangement, it consists of main bar, sub bar(upper part 2 layer, lower part 2 layer). But it has difficulty in maintaining rebar up/down distance by folding top sub bar over main bar and sub bar(upper part 3 layer, lower part 3 layer).
5) Sequence of base slab rebar arrangement

* Arrange the bars in numerical order suggested above.
* Use spacer and bar support to install within 1m each transverse & longitudinal direction for upper & lower part rebar and also install to 1st rebar for each end.
6) Check after assembling slab

After construction of slabs, the supervisor should check following matters.

① Are pillars of adjacent floor (usually upper floor) well positioned having intended dimensions?
② Is cover depth of slab well distributed and balanced?
③ Is there any abnormally inclined bent bar?
④ Are spacer and bar support rightly installed to be strong bar splice all right?
⑤ Is slab Bar splice all right?
⑥ Is reinforcement at the opening acceptable?
⑦ Enough splice length to the next floor?

Any dissatisfaction with items above will lead to poor construction and safety problems.
In particular, if it is the matter of columns, it is very difficult to rebuild it and has poor appearances.
And it is also an economical burden to the builder.

7) Position of slab tying

good position for tying
8) Understanding of slab drawing

① If all bottom of slab symbol is different per span, rebar arranged to main bar direction for short side. If span will be reverse direction, you should check in advance because main bar will be reverse direction. (especially in case slab stepped pulley)

\[
\text{down 200mm to right side from left side of solid line}
\]

In the plane drawing of open part, you can see the inside as above when you see to arrow direction with dotted line and also you can know in detail with chart about the size of beam and also which rebar will be installed.

Especially, you should check section drawing well.

If you cut plane, you can see elevation(verticality), reversely if you cut elevation, you can see plane.

In any drawing and plane, we mark section for the part to understand difficultly to help you for processing and arrangement on right section of drawing.

It is best way to get the training of supervisor and you must study symbols on drawings.
② 1S1 (1 means 1st floor, S means Slab, 1 means #1(type))

("A" TYPE)
slab thickness 120mm

("B" TYPE)
slab thickness 150mm

※ Reference: dot line means lower part rebar, solid line means upper part rebar

<table>
<thead>
<tr>
<th>Classification</th>
<th>Symbol</th>
<th>Type</th>
<th>Thickness</th>
<th>Transverse direction(Lx)</th>
<th>Longitudinal direction(Ly)</th>
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<td>B</td>
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<td>A</td>
<td>120</td>
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③ Detailed drawing of beam and slab's connected part

SLAB upper part rebar doesn’t tie to beam main bar

※ Author's viewpoint: If you did not study shop drawing completely, you will solve question if you will start construction by discussing to check wrong one after visiting construction site after checking the drawing under construction over 80%.(especially, carpenter's process is over 80%).
9) Principle of ground slab

① Bar arrangement in the floor slab begins 50mm from the slab wall side having constant spacing.

② Arranged bars should be strong enough not to deflect when a person steps on them.

Unscreened gravel and bricks can not be used in order to keep spacing between bars, and specified bar supports and spacers should be used to maintain the dimensions and shapes of the slab as intended.

③ After arrangement, single bar might need to be cut off with oxy-acetylene cutting in the requirements of collecting well or manhole.

In such cases, there could be cracks at the end tips of bars, and therefore more reinforcement and splice should be adopted here.

※ The most important thing in floor slab - Base Tamping

► After shovelling, the land must be tamped with vibration compactor.

► Even though drawing does not refer to tamping, the worker must bear it in mind as specification indicates.

However, it is real situation that there are little workers to keep it.

► Both the client and the builder should hold it in common that even the neglect of construction rules and standards will lead to fatal harms to both of them.