structural forum

Results for March Drawing Quality article

Two types of mistakes are listed below. The mistakes identified by number (i.e., 1, 2, 3 …) are detailing or design mistakes for which there can be no argument. The mistakes identified by letter (a, b, c …) are "gray area" issues that some could argue are not good practice while others could argue are perfectly acceptable as shown.

1. Welded wire reinforcing shown too far down below top of slab

2. WWR shown out of scale. Cross wires should be drawn at 6" o.c.

3. No length indicated for reinforcing bars

4. Reinforcing bar bends have a radius on them. It's not good detailing practice to draw sharp bar bends (especially for the larger bar sizes.)

5. When pointing to the top of a slab the leader arrow should not be pointing to the underside of the top surface – it should point down onto the top of the slab.

6. 2" deep floor deck is draw out of scale.

7. 2" deep floor deck is not drawn with the correct deck profile for composite floor deck commonly used in the U.S.

8. "All around" weld symbol is not appropriate when a continuous angle is welded to the top flange of a beam.

9. "All around" weld symbol (the circle) is drawn too small. (note: See page 8-31 of the 3rd Edition AISC Manual for additional info on how weld symbols should look.)

10. Fillet weld size is shown on wrong side of fillet weld triangle.

11. Fillet weld symbol (triangle) is drawn backwards.

12. Fillet weld symbol is drawn to small and should be drawn as a 45-degree right triangle.

13. Headed stud on beam flange is drawn too small and out of proportion (head too big).

14. Edge of relieving angle should not be drawn flush with face of brick.

15. Brick as drawn makes no reference to the soft joint required between the underside of the relieving angle and top of brick.

16. It's bad practice to show too much information pertaining to non-structural items on structural details. The face brick is non-structural and structural engineers need only show a single line representative of the approximate location of the outside of the brick. There should also be a note saying something like, "facade brick, see architectural drawings". As drawn the detail could be interpreted to indicate that:

i. Face of brick is flush with tip of angle

ii. No soft joint required

iii. No sealant joint required

iv. No weep holes required

v. No flashing required.

17. Detail is vague on how relieving angle is to connect to the hanger angles.

18. No size or spacing indicated for the angles.

19. Field weld flag drawn "too skinny". (See the AISC Manual for a "go by" flag.)

20. Fillet weld size shown is probably way bigger than needed. 3/8" fillet welds require multiple passes (expensive).

21. Weld arrow is not pointing at anything and is not pointing in correct direction.

22. Vertical angle can't be welded or bolted to the horizontal angle if the outstanding leg of the angle is oriented as shown.

23. Solid lines can't overlap solid lines. Which angle is in front?

24. 6x6 angle should have small fillet where the inside face of the vertical and horizontal legs meet.

25. Size of continuous reinforcing bar not shown.

26. 6x6 angle is too big for the 5 ¼" thick slab. The vertical leg of the angle will stick above the top of the slab and make it difficult to screw the concrete.

27. The 6x6 angle is also much bigger than is needed (i.e., a waste of steel). A gage metal pour stop would probably be more appropriate for this condition.

28. W shape beam not drawn properly. Webs are never thicker than the flanges. Fillets occur at intersections between flanges and web.

29. There should be a gap shown between end of the beam and web of supporting girder (about ½").

30. Information on welds between the angles and W shape are missing.

31. Bolts should be drawn at 3" o.c.

32. First row of bolts is drawn too far down from top of beam. (First row of bolts is normally 3" down from top of beam)

33. Connections at the ends of W14 beams normally don't have more than 3 rows of bolts when double angle connections are used.

34. Top of W14 beam should be shown with the top flange coped where it connects to the girder.

35. Weld leader arrow is not pointing to the correct spot.

36. Weld all around requirement and 3/8" fillet weld is way more weld than is probably needed.

37. How far down is relieving angle from bottom of the supporting hanger angle? (i.e., is it ok if the bottom of the hanger terminates 3" above the bottom of the relieving angle? (Probably not!)

38. Line too short (ok, so I'm a nit-pick!)

a. No need to show top of slab elevation on detail if it is indicated on the framing plan (which it should be)

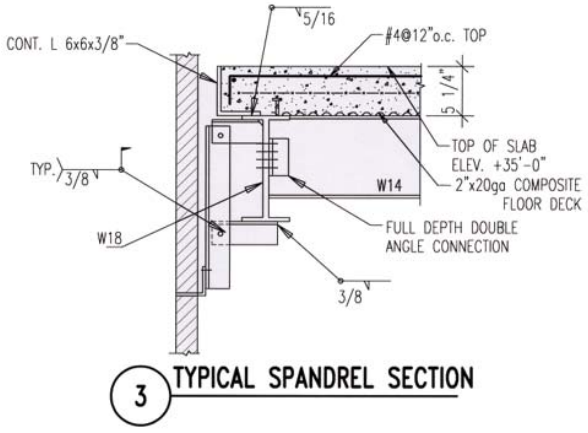
b. No need to specify type and gage of floor deck if it is specified on the framing plan (which it should be).

c. Be consistent with the way leaders are drawn. (i.e., justification of leader line with respect to text.)

d. There is usually no need to hatch concrete (showing stone). This often just clutters up the detail and can obscure the reinforcing steel in the slab.

e. No need to show the slab thickness in the sections and details if this information is shown on the framing plans (which it should be).

f. If the section is cut on plan, then there's really no reason to give it a title.■



"Fictitious" modern-day CAD-drawn detail showing many common drafting and detailing errors. How many can you find?