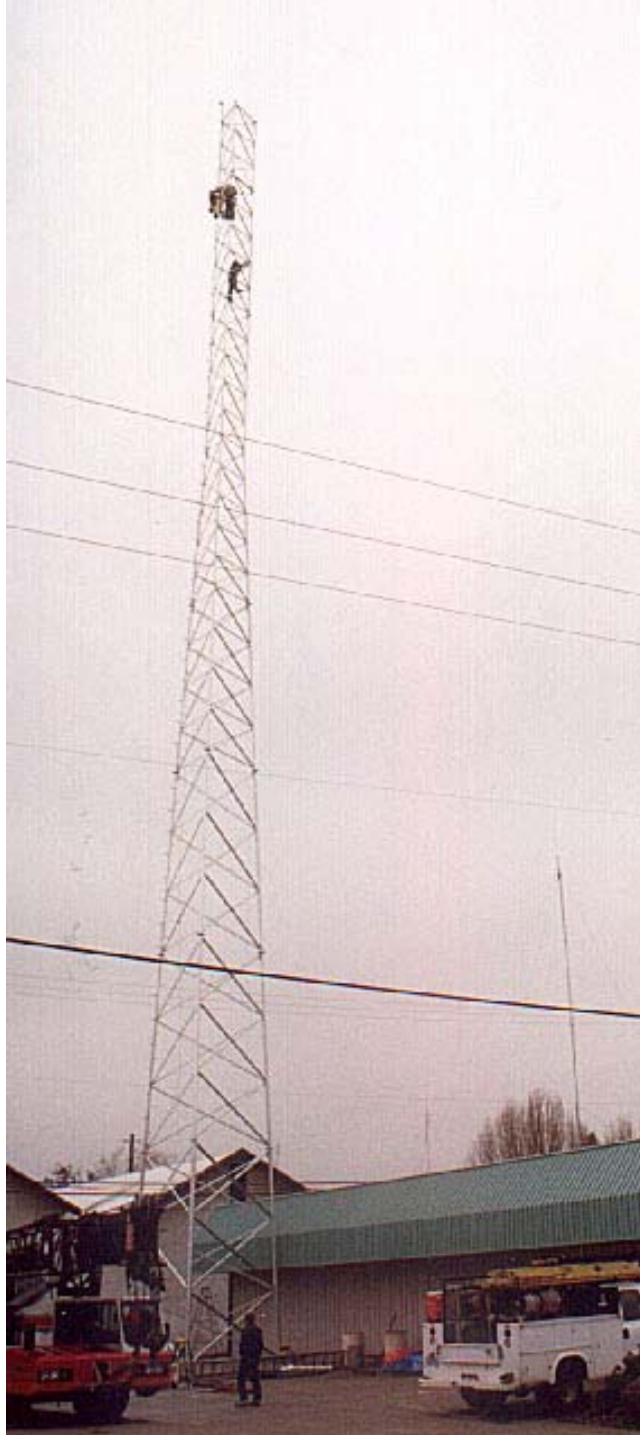
ColusaNET's WISP Tower Project

www.do-it-yourself-tower.com

This presentation chronicles the complete installation of a 150' Self Supporting Tower including the entire foundation project.



This presentation and all photographs:

Topics Covered in this Presentation:

- Tower Selection
- Engineering Information
- Make a Plan
- Foundation Preparation
- Making the J-Bolt Fixture
- J-Bolt and rebar placement
- Pouring the cement (monolithic)
- Assembling the Tower Sections
- Stacking the Tower Sections

Official Disclaimer and other boring issues

I am not a licensed contractor nor a licensed engineer. If you embark on a project such as a tower installation, as is presented here, as well as any other projects that may appear in the future on www.do-it-yourself-tower.com, you should seek appropriate professional advice. Erecting a tower is not a trivial undertaking. There are issues that must be engineered by qualified and trained professionals. You can not do this by guessing. A properly engineered tower will perform as it was designed, and will ensure maximum safety.
DO YOUR HOMEWORK!

Tower Selection: How much tower do I really need?

A) Figure out how much you can afford to spend on the entire project for starters. In my case, the tower cost was about half of the total cost of the entire project. Approximate dollar amounts for my situation will follow.

B) Find out what weather zone you're in. Get to know your local building inspectors, they'll know. Pray they will like you.

C) Shop around for towers for a while, paying attention to the amount of wind load they'll support for your zone, whether ice is in play, etc. Mine was a "2 carrier" tower.

C) Do some simple calculations to determine the amount of loading (surface area) you THINK you want on the tower. Then, allow for way more than that.

Tower Selection: How much tower do I really need?

D) Factor reasonable growth into “C”, then double it.

E) Double or triple what you came up with in “D” above.

F) Multiply that by 10.

In other words, it was my intention to put up as much tower as I could possibly afford. A renter might come along. One renter could pay for the entire tower over a few years.

My “two carrier” tower is designed for 2 of those standard issue tri-angular platforms you see everywhere, each loaded with sector panels, one at 140’ and one at 149’ for a total combined allowable surface area of about 100 square feet as well as a few thousand pounds of mass. I’m in a zone rated at 75MPH maximum wind and no radial ice.

Engineering Information to get:

I would recommend you acquire a copy of these and/or whatever is required by your building inspector and/or tower manufacturer.

1) ANSI/TIA/EIA-222-F-1996
"Structural Standards for Steel Antenna Towers and Antenna Supporting Structures."

This document cost me $104.00 downloaded. A quick search led me to Global Engineering Documents at www.global.ihs.com. I'm sure there are other sources too. Search for TIA/EIA-222.

Topics include; wind loading, paint, guys, foundations, climbing, maintenance to name a few. About 115 pages. It specifies the bolt tightening specifications most importantly. Probably worth having in any case. It's full of tower related information.

Engineering Information to get:

I would recommend you acquire a copy of these and/or whatever is required by your building inspector and/or tower manufacturer.

2) LRFD Specification 94

"Specification for Structural Joints Using ASTM A325 or A490 bolts."

I found this document at www.boltcouncil.org and it was free, but it is a version only usable for reference. This document covers bolted parts, design of bolted connections, tightening specifications and other accepted procedures you might want to be familiar with. My tower specified grade A325 bolts. They came with the tower.

3) Rebar placement guidelines.

Information on industry standards for the placement of reinforcing bar in concrete structures.

Get the drawings and make a plan

1- I placed my PO and made a partial payment in order to obtain the drawings before starting anything.

2- Once I had the drawings, I decided on location: in the parking lot right next to the building, the logical place to put it in my case. Make sketches. Ask for advise from professional sources if you have to. **Do your homework. Ask for help. Hire professionals when needed.**

3- Inquire with planning department regarding set-backs or other applicable zoning issues if any.

4- Call for underground utilities check, usually free.

5- Get your checkbook ready

6- Check with www.fcc.gov to see if you have to register the tower.

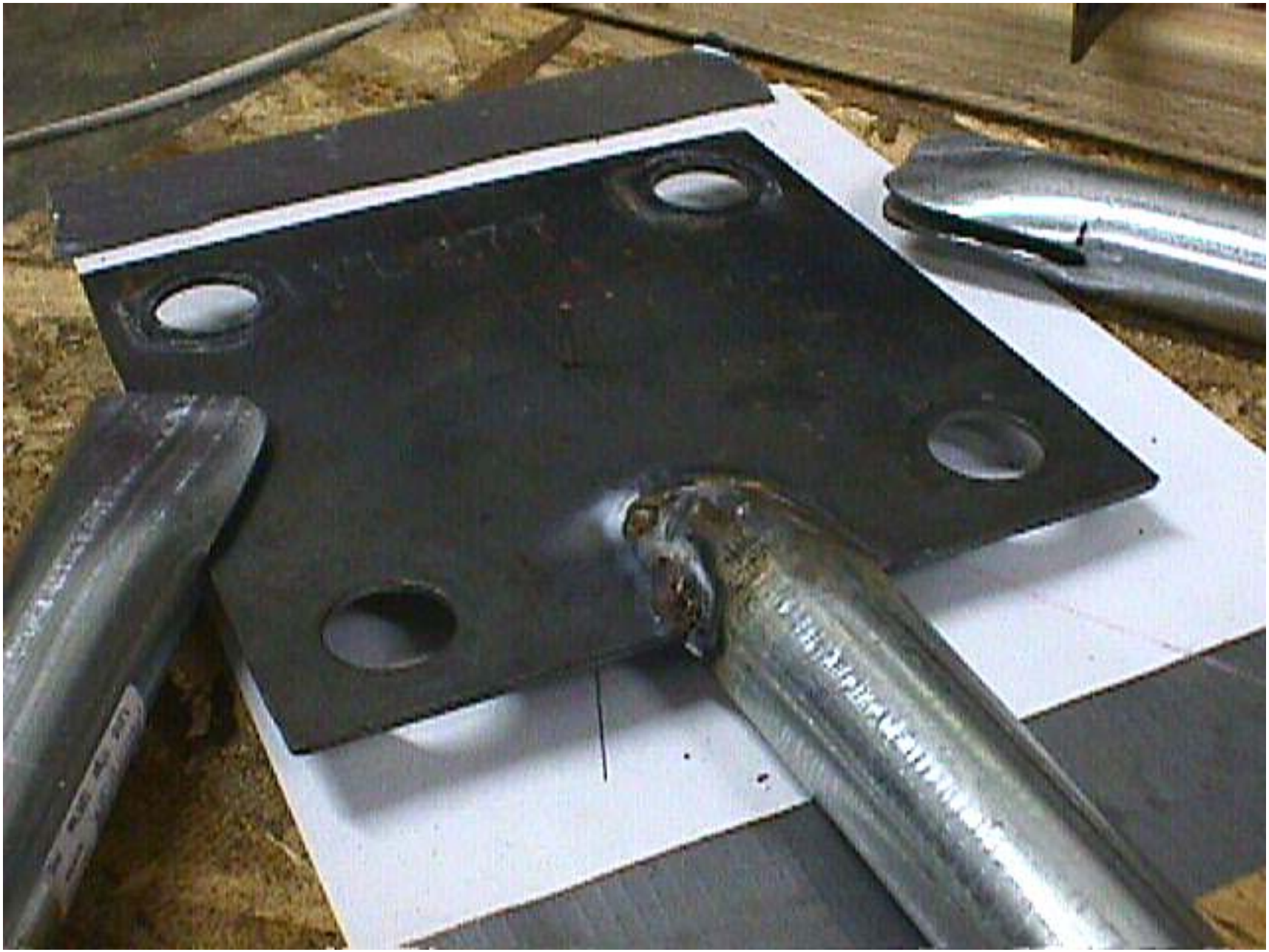
Foundation Preparation

-or-

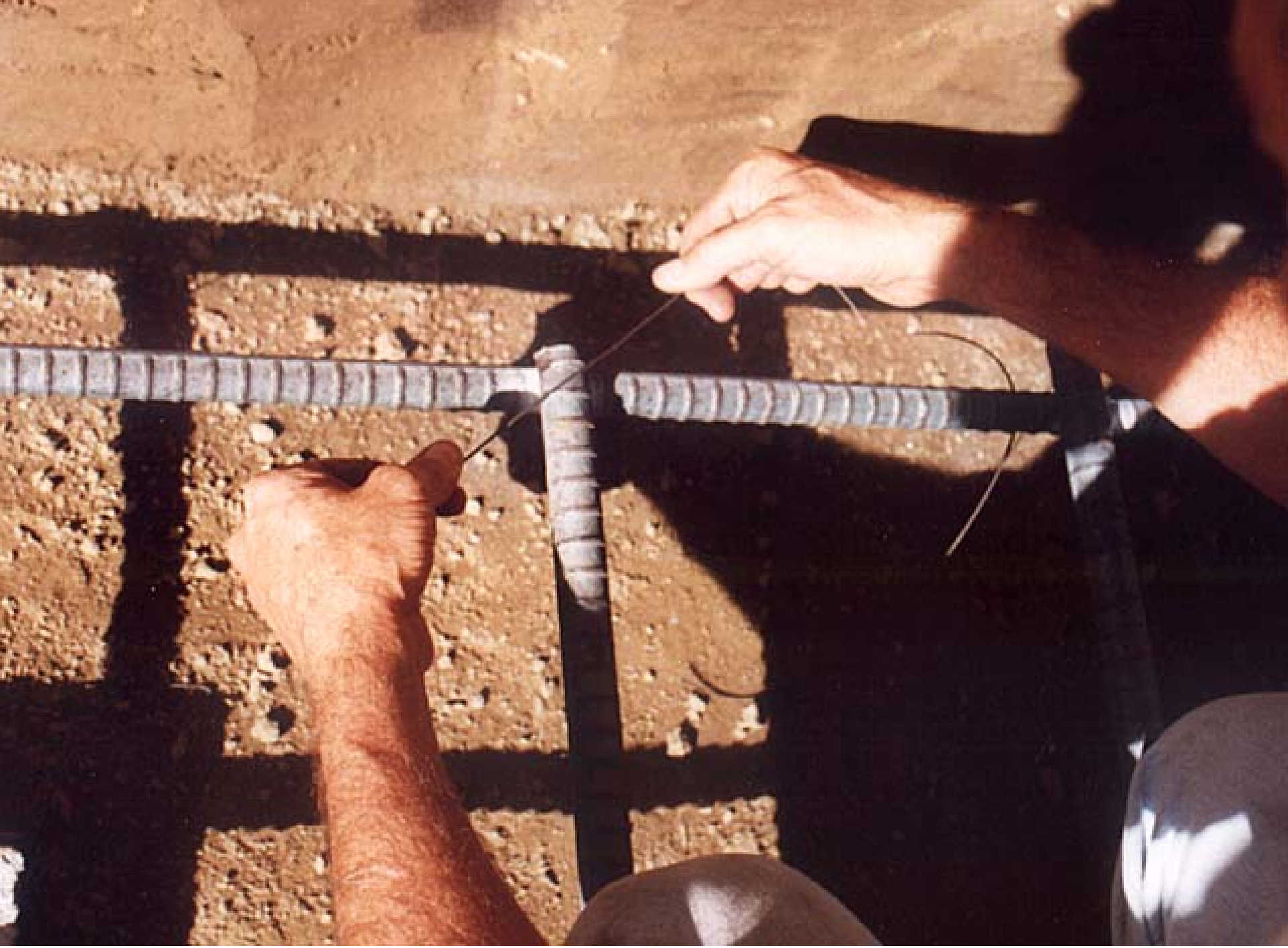
Realizing how few friends you really have.

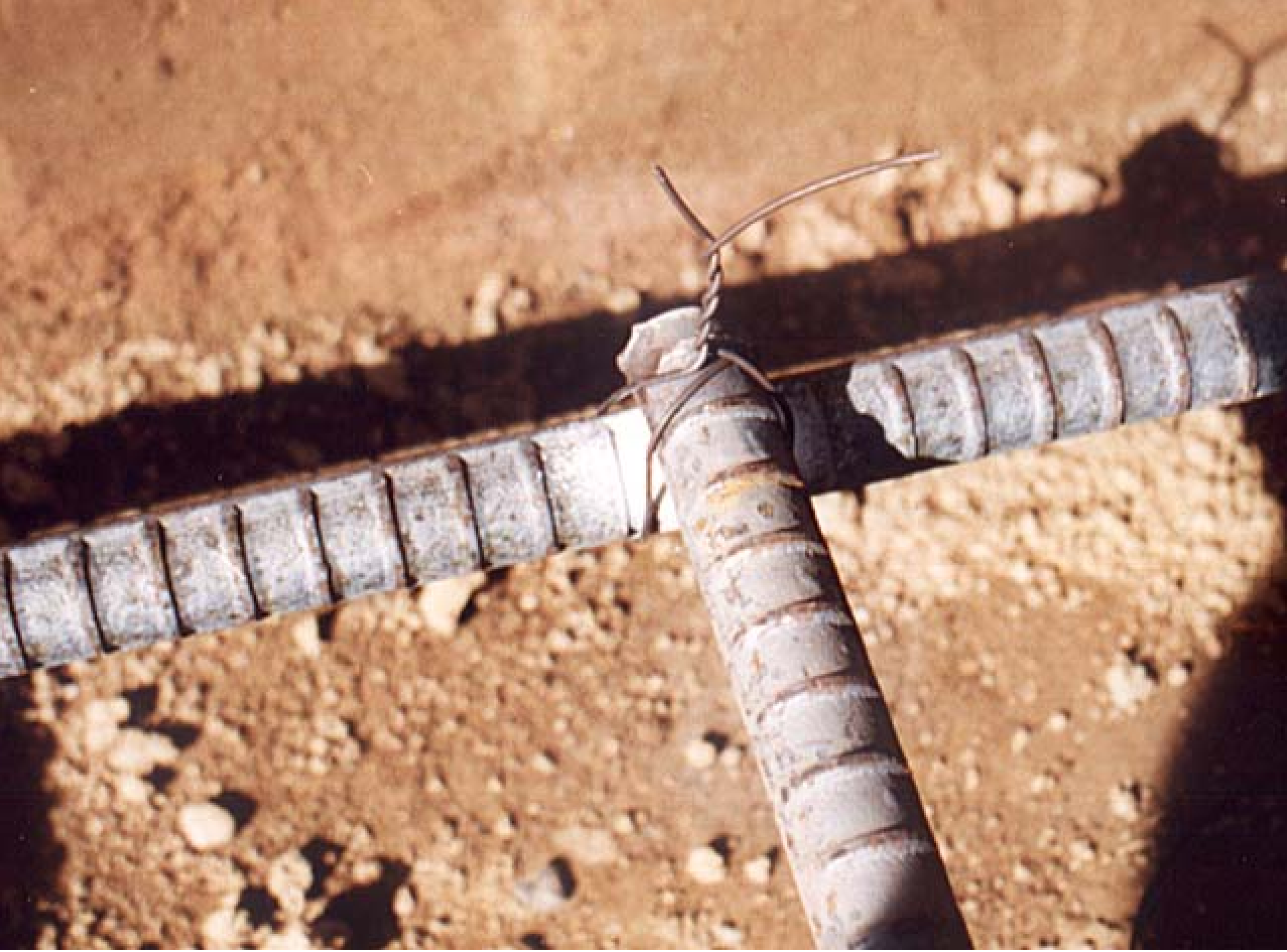

FORD

Making the J-Bolt Fixture



J-Bolt and ReBar Placement

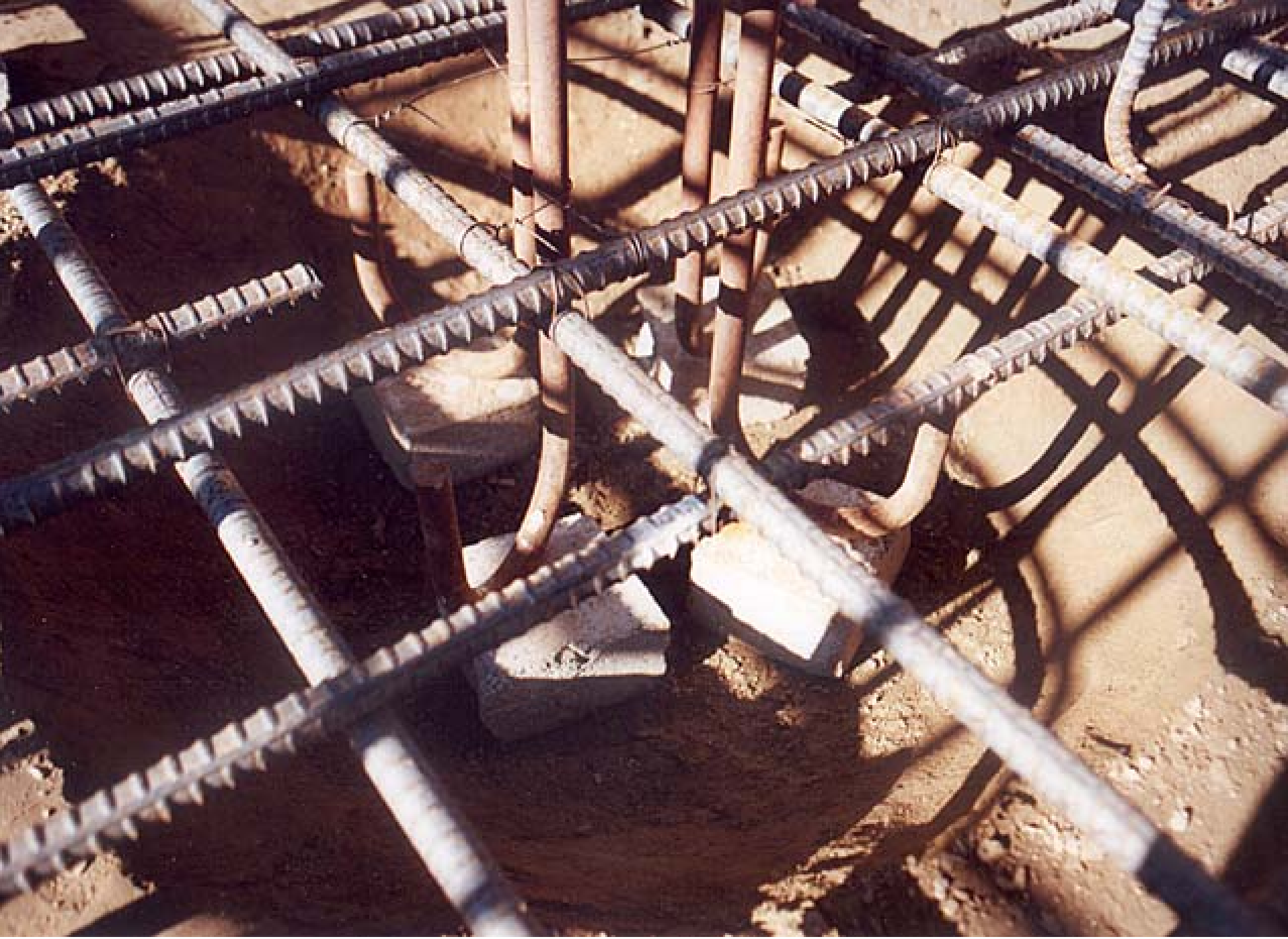


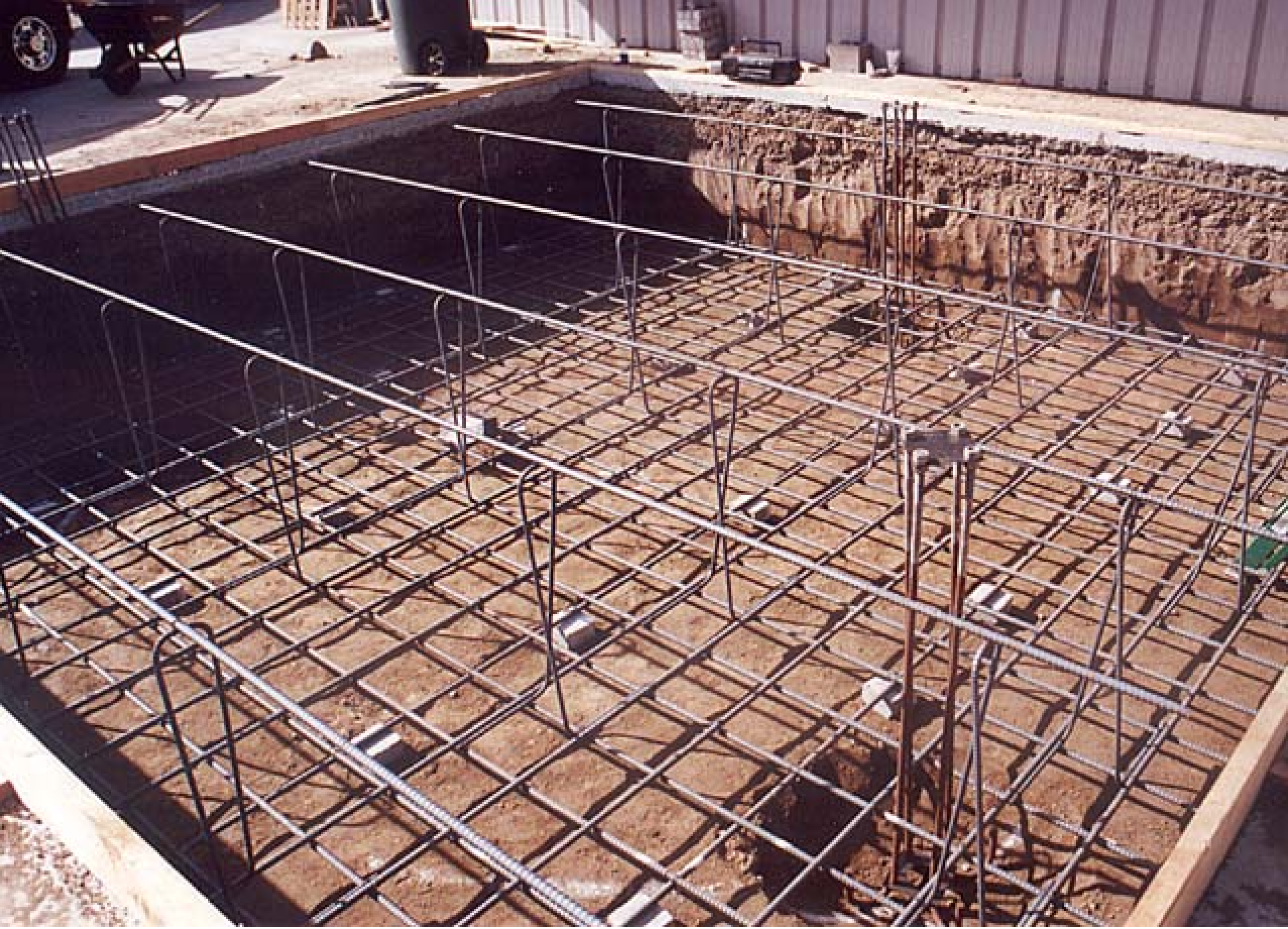


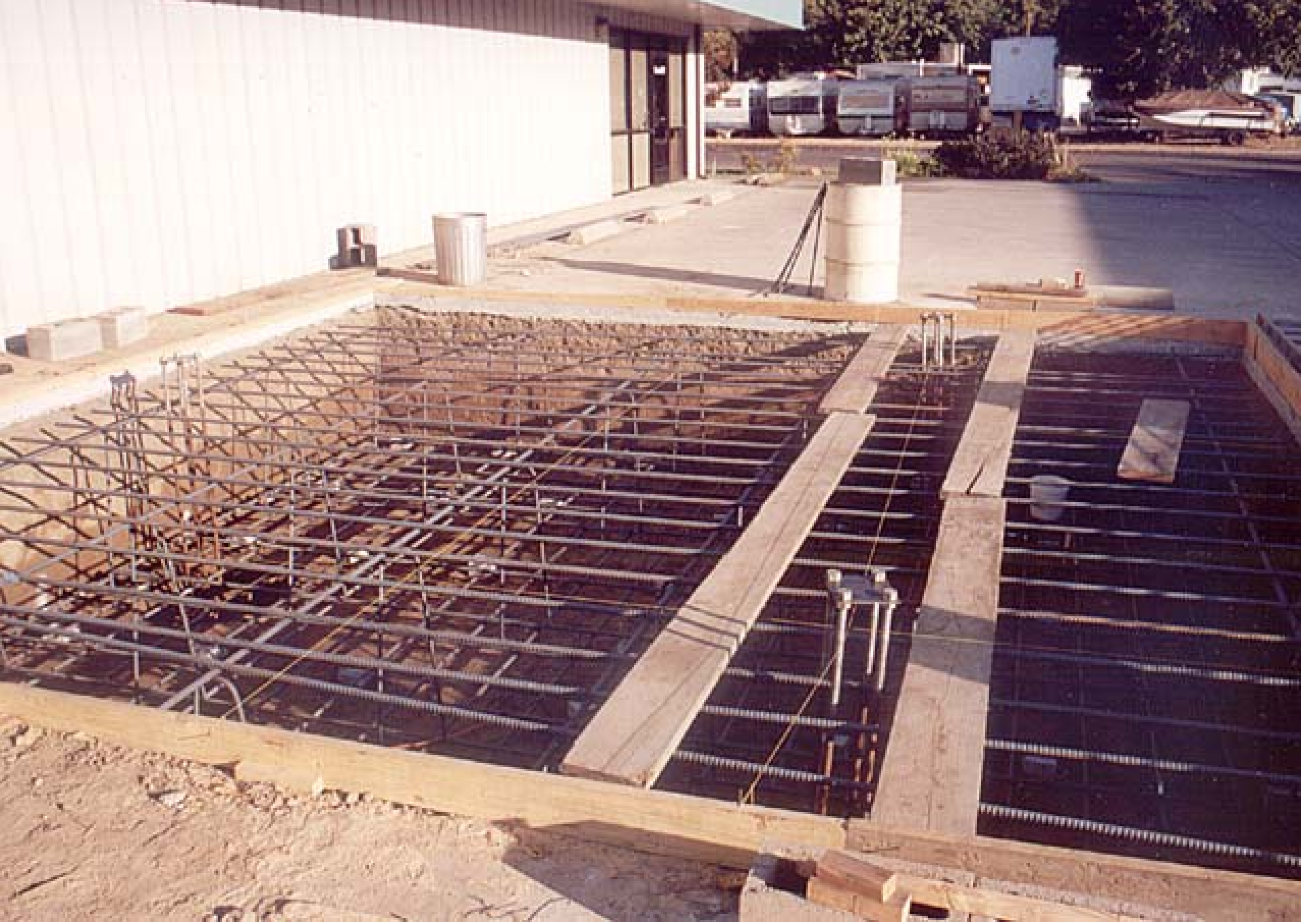
This is called a “standee”. These typically come from your rebar supplier and are bent per your specs. They get tied to the lower grid to support the upper grid.

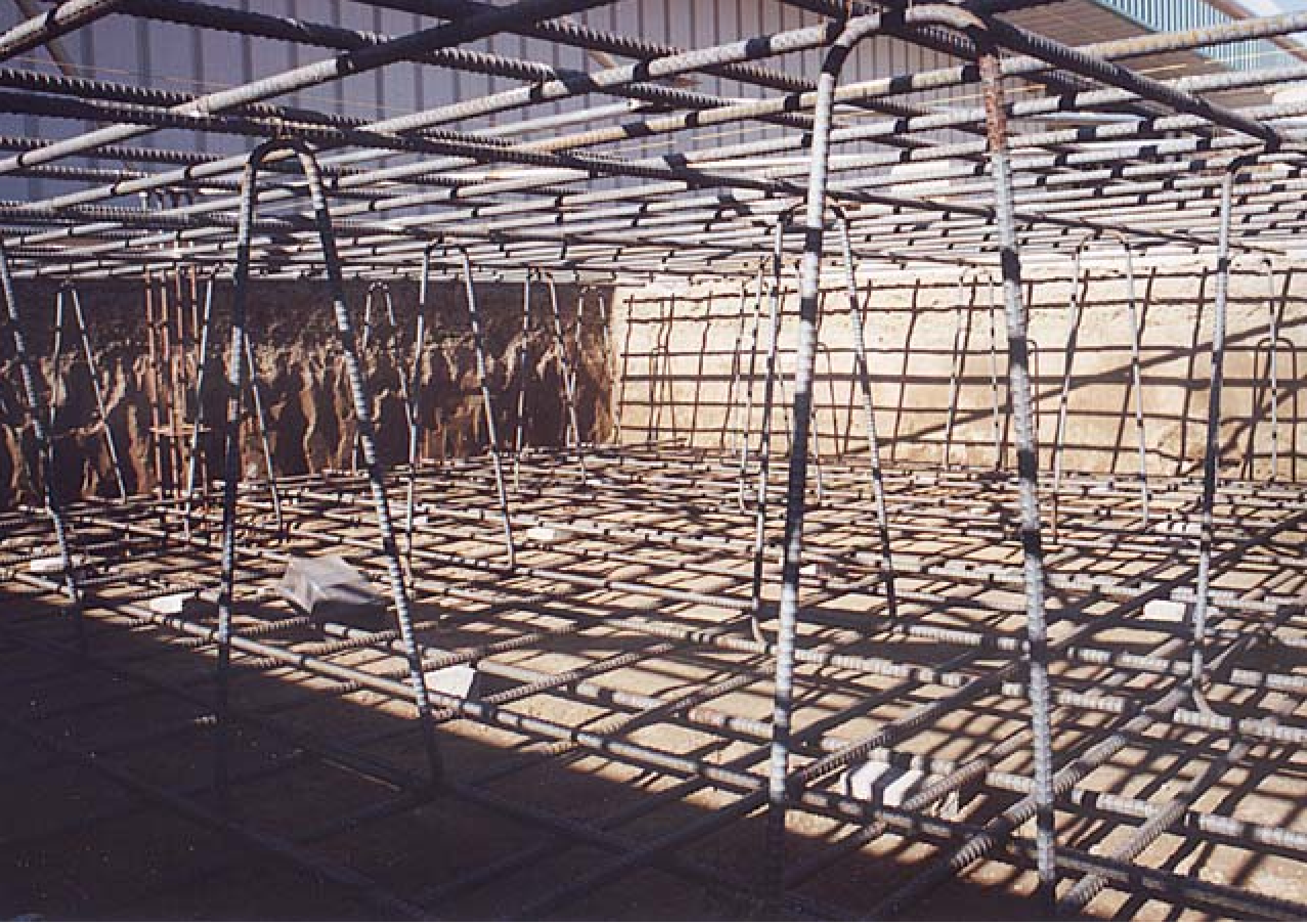
These need not be made of special steel, are not part of the structure and don’t get inspected.

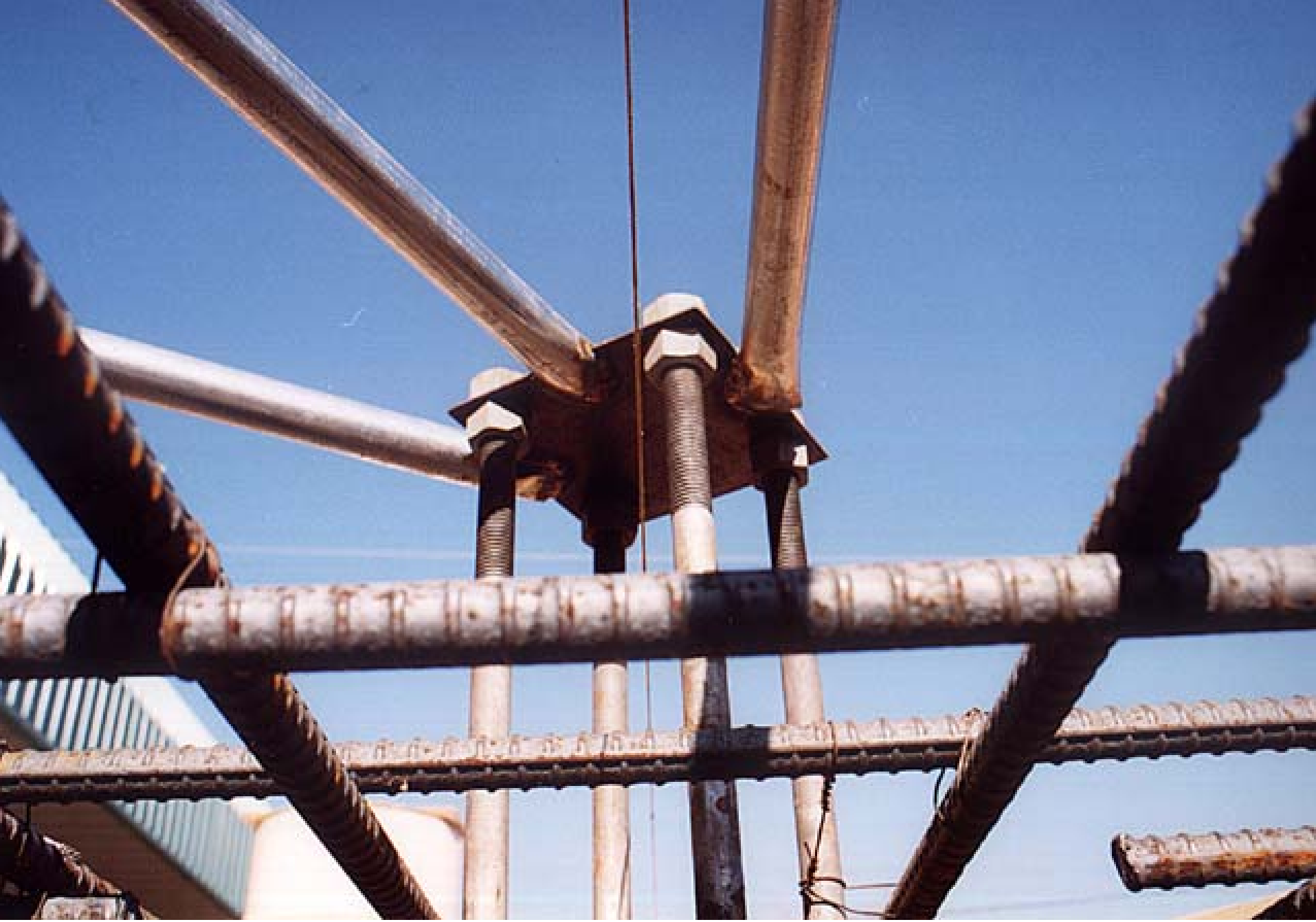
Be careful when you specify the dimensions.











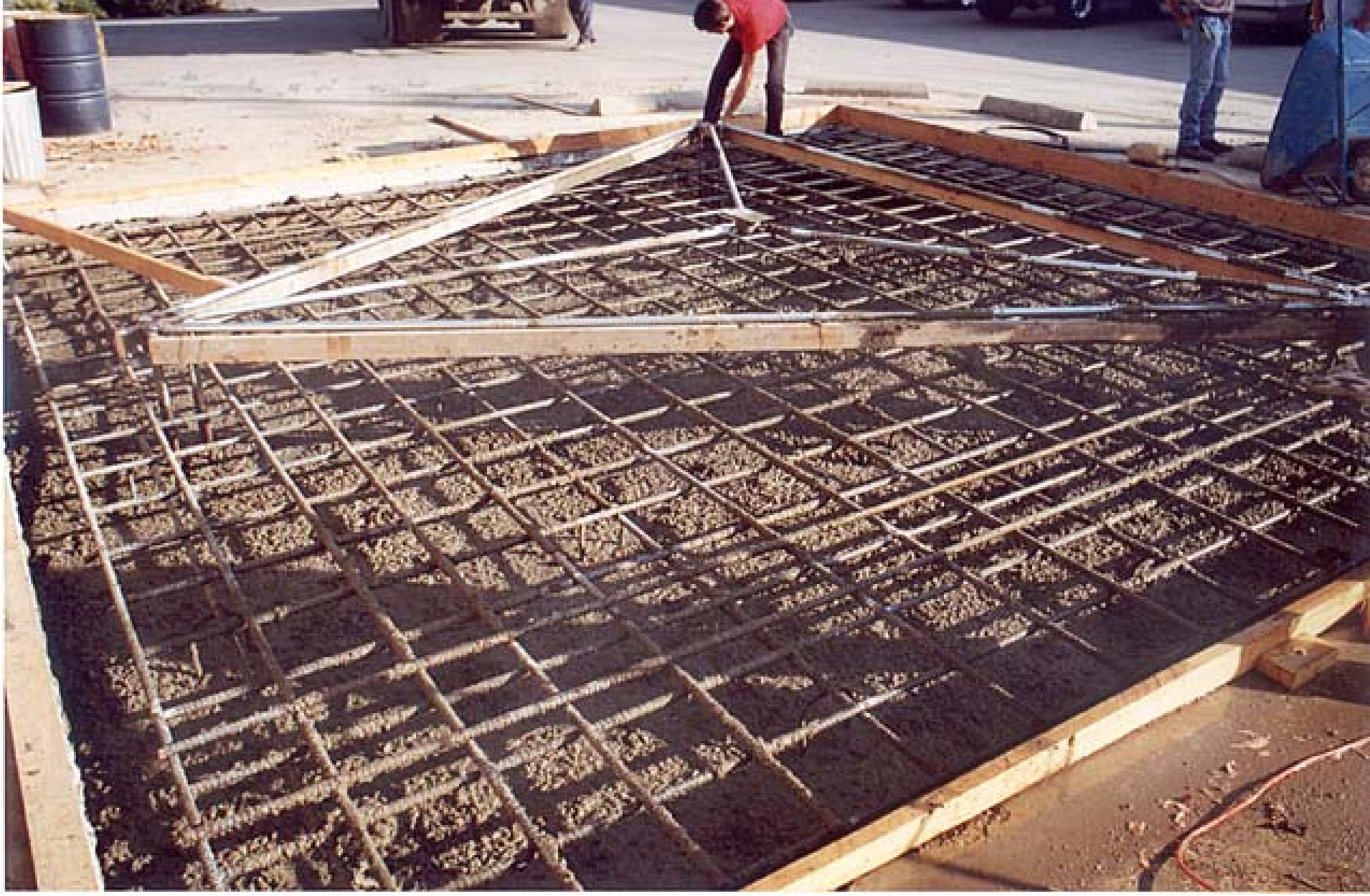
Building Inspector needed at this stage

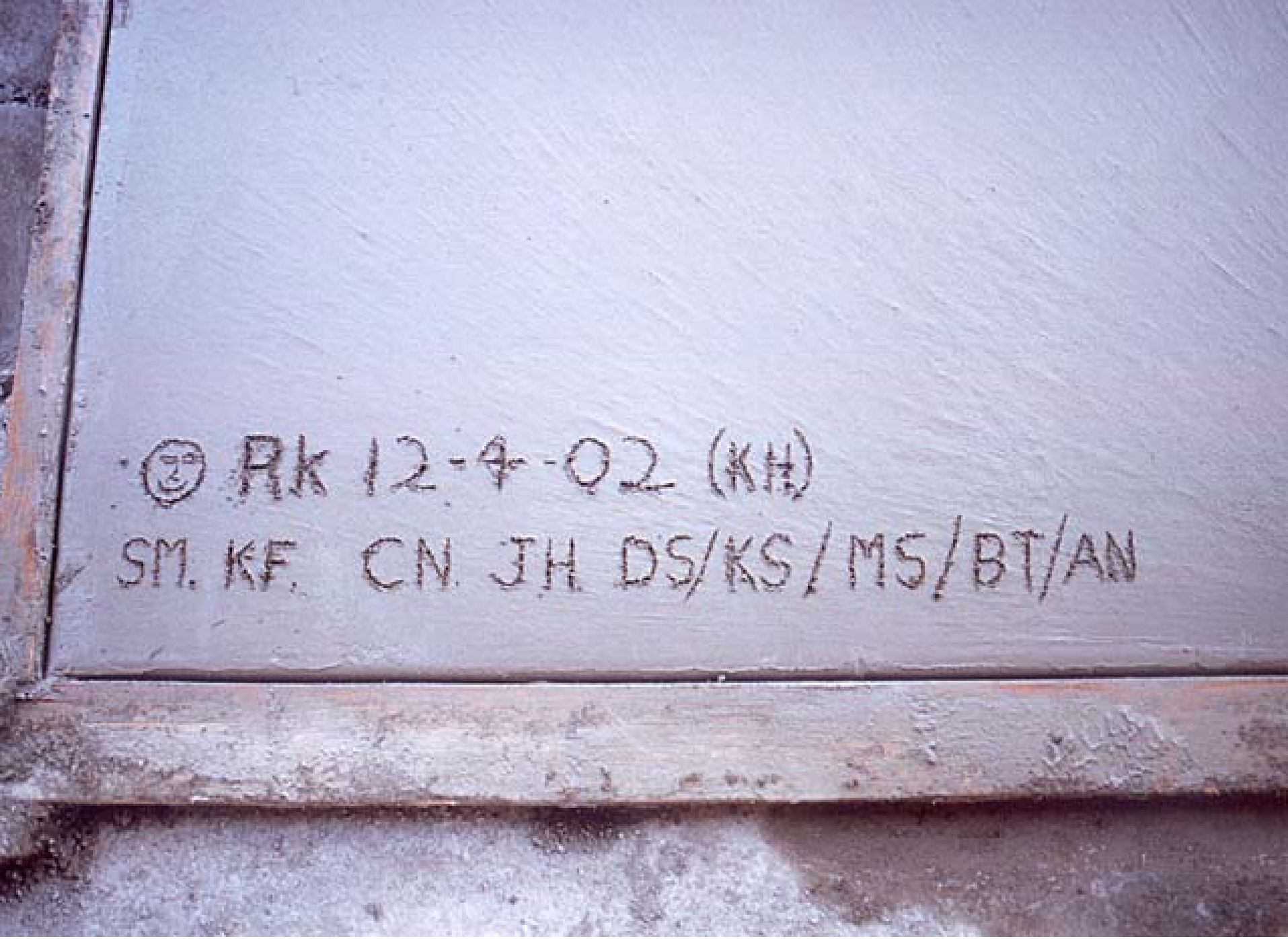
Your building inspector will probably want to sign off on the foundation preparation before you go any further. Check with them before you get to this point to be safe. DON'T POUR CONCRETE WITHOUT CHECKING WITH YOUR INSPECTOR FIRST!

Special Inspection Required Next

You will probably have to hire a "Special Inspector" for the next stage, the pouring of the concrete. Your building inspector will specify whether this is necessary or not. They take samples of the cement and test them for overall strength to assure it meets the specifications prescribed by the tower manufacturer, and they also act as an independent third party authority as to the grade of rebar and techniques used during the pour. They were also required after final stacking to verify the torque on the flange bolts in my case.

Pouring The Cement

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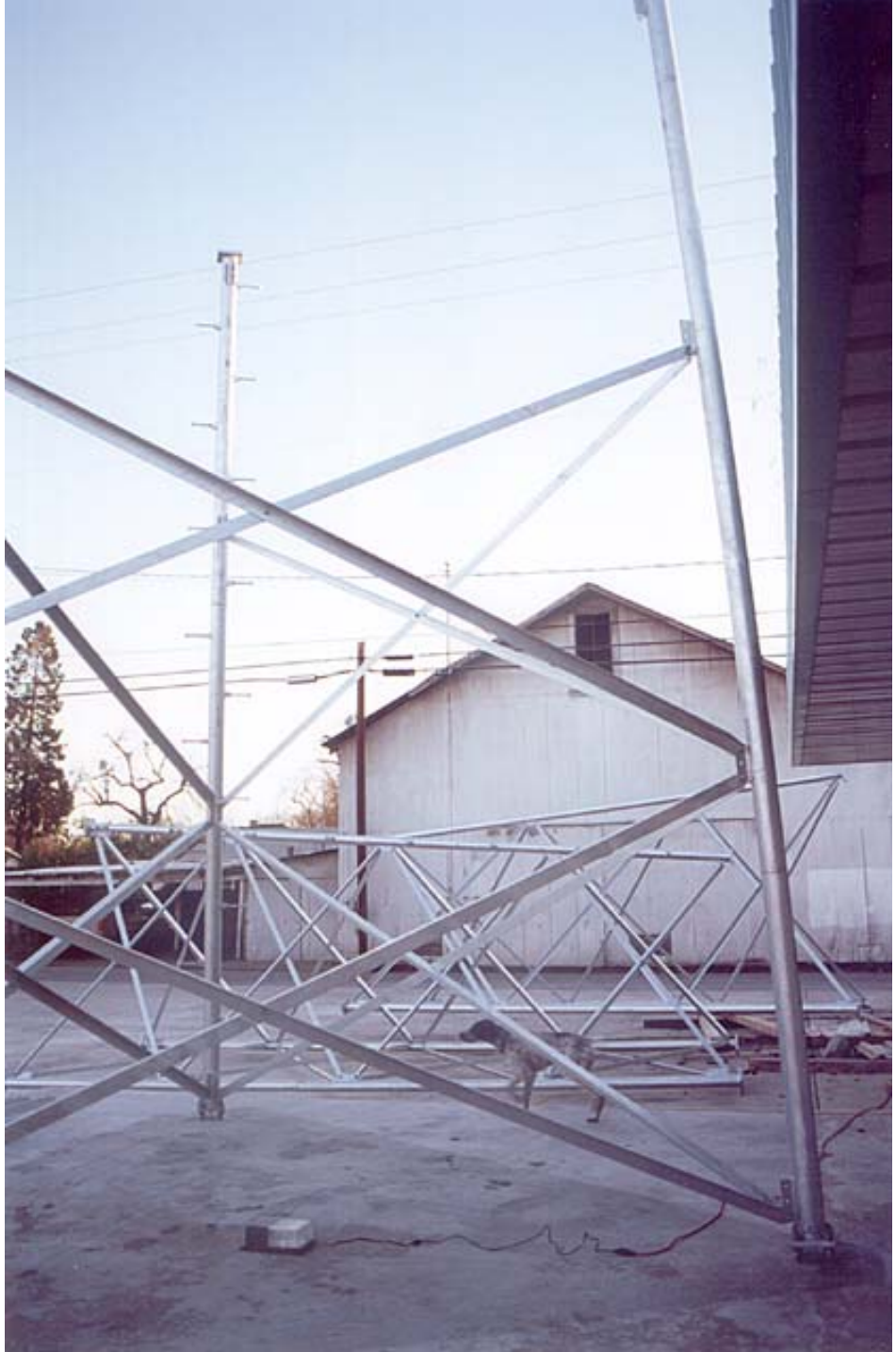
Assembly of the Tower Sections


HYSTER



Final Stacking of the Sections


ERAGG


GROVE