Appendix J-2

Design Calculations for Concrete Slab

Project: RCRA Part B Permit Application

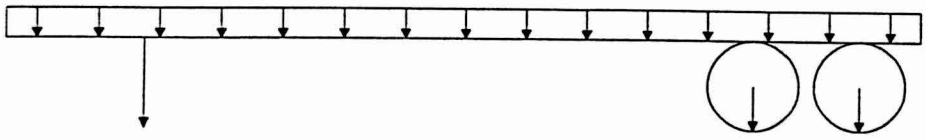
Client: Shell Chemical Yabucoa Inc.

Date: April 1998

Design of the Concrete Slab for the HW Storage Building at SCYI

1. Load Determination:

52,000 Lb



2. PCA Method

Concrete compressive strength	$fc := 3000$ psi
Modulus of Rupture	$MOR := 9 \cdot \sqrt{fc}$
	$MOR = 493$ psi
Modulus of Subgrade Reaction	$k := 100$ pci
Factor of Safety	$SF := 1.5$
Total Load	$TL := 52000$ Lb

Assuming 100% of static load on one axle (or a pair of posts).

Load on each wheel or post	$PL := \frac{TL}{2}$
	$PL = 26000$ Lb
Allowable Stress	$As := \frac{MOR}{SF}$
	$As = 329$ psi
Stress per 1000 Lb of Axle	$SA := \frac{As}{\frac{PL}{1000}}$
	$SA = 12.64$ psi

Case 1: Loading on the inner rear wheel

Spacing between Wheels $Sw := 55$ Inches

Contact Area $CA := \frac{PL}{250}$

$CA = 104$ $Inches^2$

Based on the Design Charts from PCA:

Slab Thickness $Tw := 7.6$ Inches

A slab thickness of **8 inches** is recommended.

Case 2: Loading on the Posts with Bearing Plates

Spacing between Posts $Sp := 90$ Inches

Contact Area
of the Base Plate (10"x8") $Cp := 10 \cdot 8$

$Cp = 80$ $Inches^2$

Based on Design Charts from PCA:

Slab Thickness $Tp := 7.4$ Inches

A slab thickness of **8 inches** is recommended.

A.3—Design Charts from Portland Cement Association, Wire Reinforcement Institute, Corps of Engineers, and American Concrete Institute

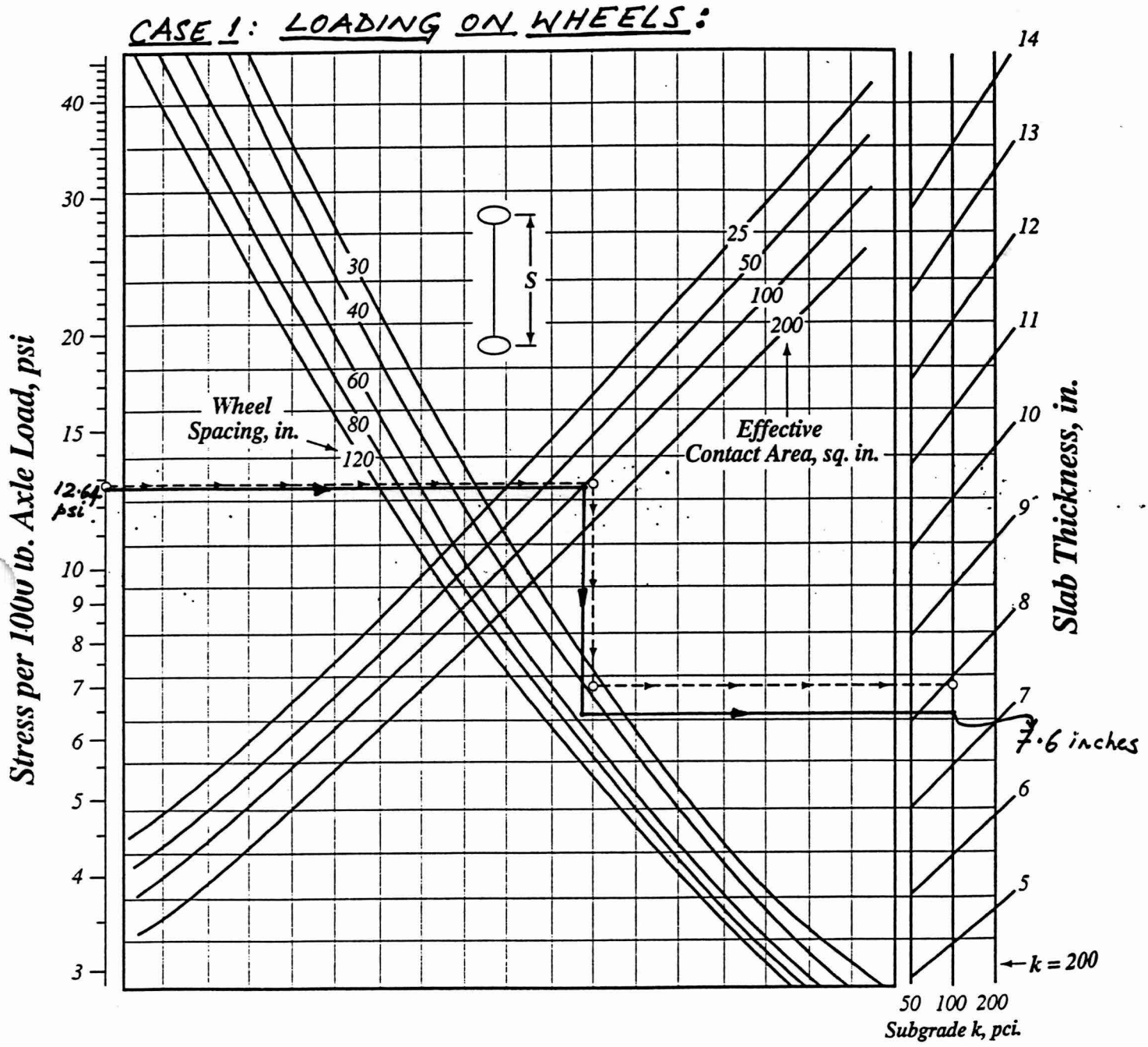


Figure A.7 *PCA design chart for selection of slab thickness for single axle loading.*

A.3—Design Charts from Portland Cement Association, Wire Reinforcement Institute, Corps of Engineers, and American Concrete Institute

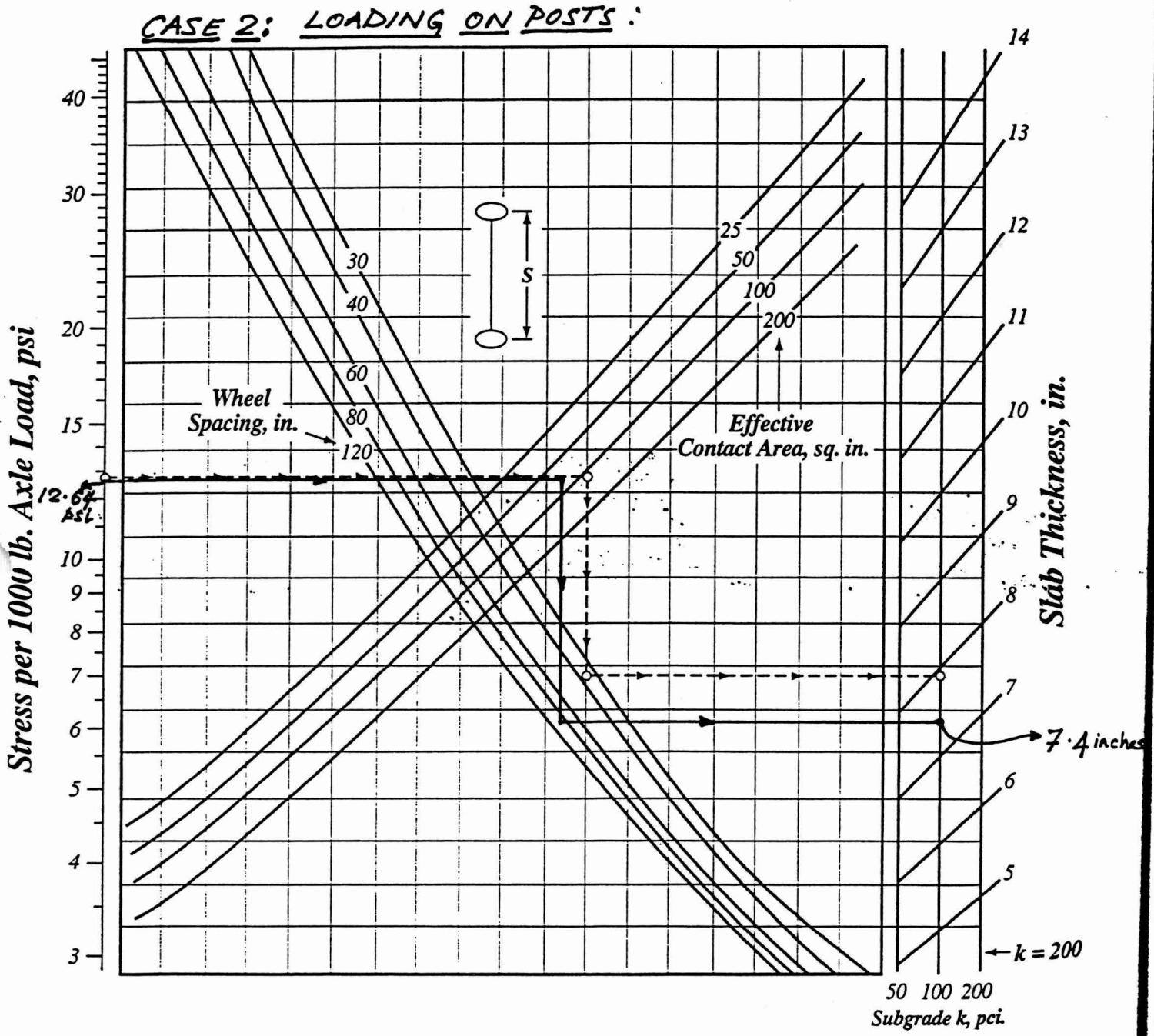


Figure A.7 *PCA design chart for selection of slab thickness for single axle loading.*

Appendix J-3

Design of Concrete Slab - Plan