

King Fahd University of Petroleum & Minerals
CIVIL ENGINEERING DEPARTMENT

CE 441

DESIGN OF PAVEMENT

Fall 2002-2003

HOMEWORK # 7

DESIGN OF RIGID PAVEMENTS

1. Design a concrete highway for the following conditions. Truck axle weight distribution data are:

Axle Loads (kips)	No. Axles per 1000 Trucks	Axle Loads (kips)	No. Axles per 1000 Trucks
16-18 S	120.9	30-32 T	70.3
18-20 S	110.8	32-34 T	34.4
20-22 S	60.3	34-36 T	24.0
22-24 S	15.6	36-38 T	17.2
24-26 S	1.3	38-40 T	16.8
26-28	0.9	40-42 T	10.5
		42-44 T	9.6

Soil explorations have indicated that the subgrade is a plastic clay with a liquid limit of 50 percent and plastic limit of 25 percent. Plate-bearing tests have indicated k to be 100 pci, corrected for saturation. The modulus of rupture of the concrete is 600 psi. ADT = 1000 Trucks 30%. Determine the thickness of concrete slab using PCA and AASHTO methods.

2. It has been estimated that the following aircraft will use a certain taxiway.

Aircraft	LRF	No. Departures	Aircraft	LRF	No. Departures
B-727	0.41	300,000	DC-9	0.72	200,000
B-737	0.45	200,000	DC-8	0.83	50,000
B-707	0.83	60,000	DC-10	0.57	15,000
B-747	0.58	20,000	Cv-880	0.81	50,000

The design " k " is 250 pci, the average 90-day MR is 600 psi. Determine the thickness of concrete pavement for these conditions.

3. Assume a nontreated gravel subbase of 12" thickness is used. Design the pavement in (2) using F.A.A. method.