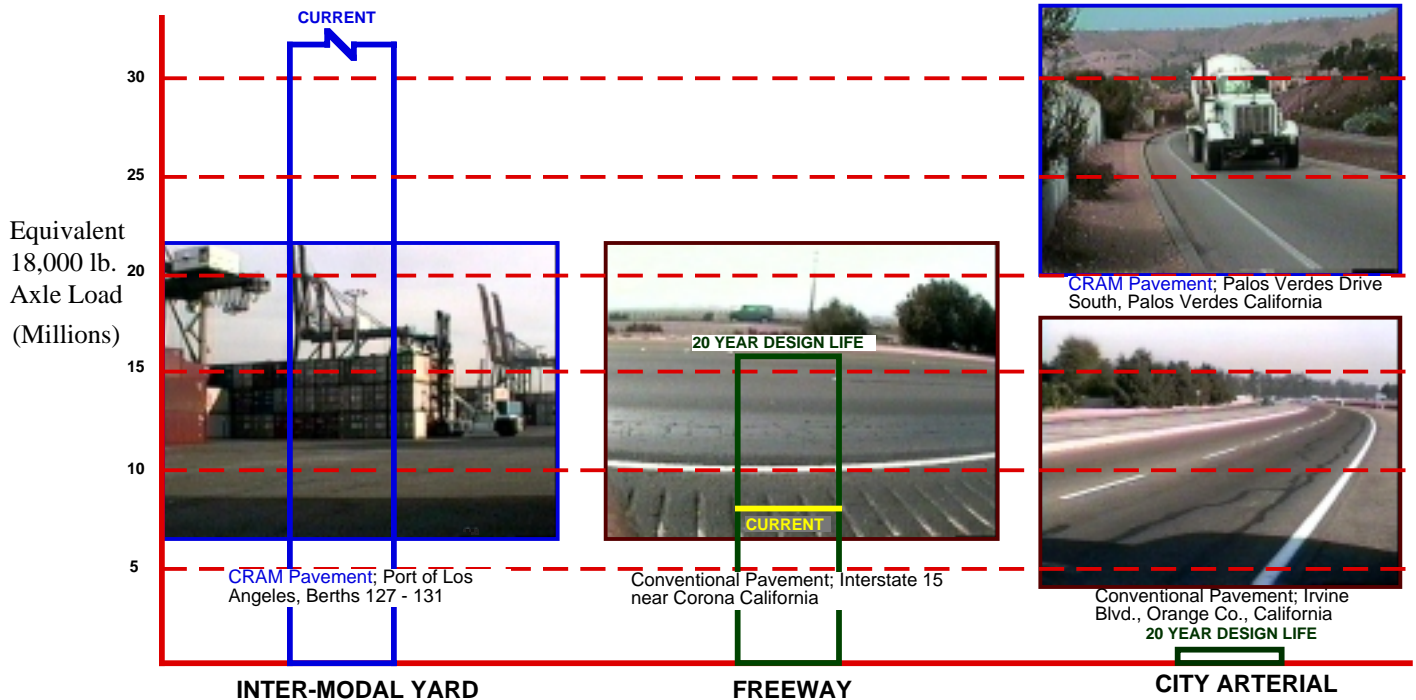


## CRAM'S FAVORABLE RESISTANCE TO HEAVY REPETITIVE LOADING



The **CRAM** Inter-modal yard under the very heavy top loader container stacking operation **has now experienced many times the equivalent axle loads of a typical freeway**, showing almost no rutting and no traffic related cracking. We contrast its **excellent condition** with that of I-15 which has been in-service for about 8 years and now showing serious cracking distress. The Palos Verdes **CRAM** Pavement after 13 years is in **excellent condition**, which is in contrast to conventionally paved city arterials such as Irvine Boulevard in Orange Co., which is 12 years old and despite a recent overlay is again showing fatigue cracking.

## CRAM'S FAVORABLE ENRICHED BASE ASPHALT MIX



CRAM Pavement; Port of Los Angeles, Berths 127 - 131, Base Asphalt Construction, Utilizing a 6 percent Bitumen Content

Engineers know that the benefits of rich asphalt mixes can not be realized by the conventional layered pavements because of the tendency of these pavements to rut during warm periods. The favorable features that we have successfully incorporated into the **CRAM** pavement by use of the rich asphalt mix include:

**A FATIGUE LIFE MANY TIMES THAT OF THE CONVENTIONAL MIX, A CONSIDERABLY INCREASED RESISTANCE TO FLUID MOVEMENT & SUBSTANTIALLY REDUCED RATE OF OXIDATION.**

ASPHALT MIX, STIFFNESS AND FATIGUE SUMMARY PORT OF LOS ANGELES			
	GRAM MD6AC	GRAM SURFACE	NYK CONV
BIT. CONT. (%)	6.0	5.25	4.7
UNIT WT. (PCF)	148.0	145.0	145.0
WT. BIT. (PCF)	8.88	7.61	6.82
WT. AGG. (PCF)	139.1	137.4	138.2
VOL. BIT., V <sub>b</sub>	0.142	0.122	0.109
VOL. AGG., V <sub>a</sub>	0.841	0.831	0.836
VOL. VOIDS, V <sub>v</sub>	0.016	0.047	0.055
C <sub>b</sub> =V <sub>a</sub> /(V <sub>b</sub> +V <sub>a</sub> )	0.144	0.128	0.115
C <sub>v</sub> =V <sub>a</sub> /(V <sub>b</sub> +V <sub>v</sub> )	0.856	0.872	0.885
C <sub>v.b</sub> =V <sub>b</sub> /(V <sub>b</sub> +V <sub>v</sub> )	0.900	0.722	0.665
M=4.84(C <sub>v.b</sub> -0.69)	1.016	0.155	-0.123
10 <sup>4</sup>	10.38	1.43	0.75
K=C <sub>v</sub> /(1-C <sub>v</sub> )	5.944	6.812	7.696

Reducing fluid movement provides much greater protection to the subgrade from moisture penetration, further enhancing mechanical life. But, more importantly, it substantially reduces the rate of oxidation. This reduced rate of oxidation now allows us to successfully build in greater mechanical life, as we can now extend this added life into real time. This is an important basis for concluding that **we can now build pavements to last for 50 years and more with essentially no maintenance!**

The excellent performance of the **CRAM Pavements** provides the empirical evidence that proves that it is now possible to build pavements that:

- **have a 50 year life,**
- **are essentially maintenance free, and**
- **can be built for substantially less cost.**