Many New PCC Pavements in California are Not Constructed Smooth Under Current Specifications

Example:

Route 58 Widening Near Mojave

Surface looking easterly (ground & not ground) – PM 121.120 area

Rt.58 westbound lanes 09-18-02

Straightedge used – note grinding gap

Rt.58 westbound lanes 09-18-02

Grinder at work

Rt.58 westbound lanes 09-18-02

Profilograph behind grinder

Rt.58 westbound lanes 09-18-02

Surface texture varies along roadway

Rt.58 westbound lanes 09-18-02

Marked areas for grinding

Rt.58 westbound lanes 09-18-02

Gap under straightedge typical throughout PM 120.636

Rt.58 westbound lanes 09-18-02

Gap left after grinding = approx. 0.25 mils (6 mm)

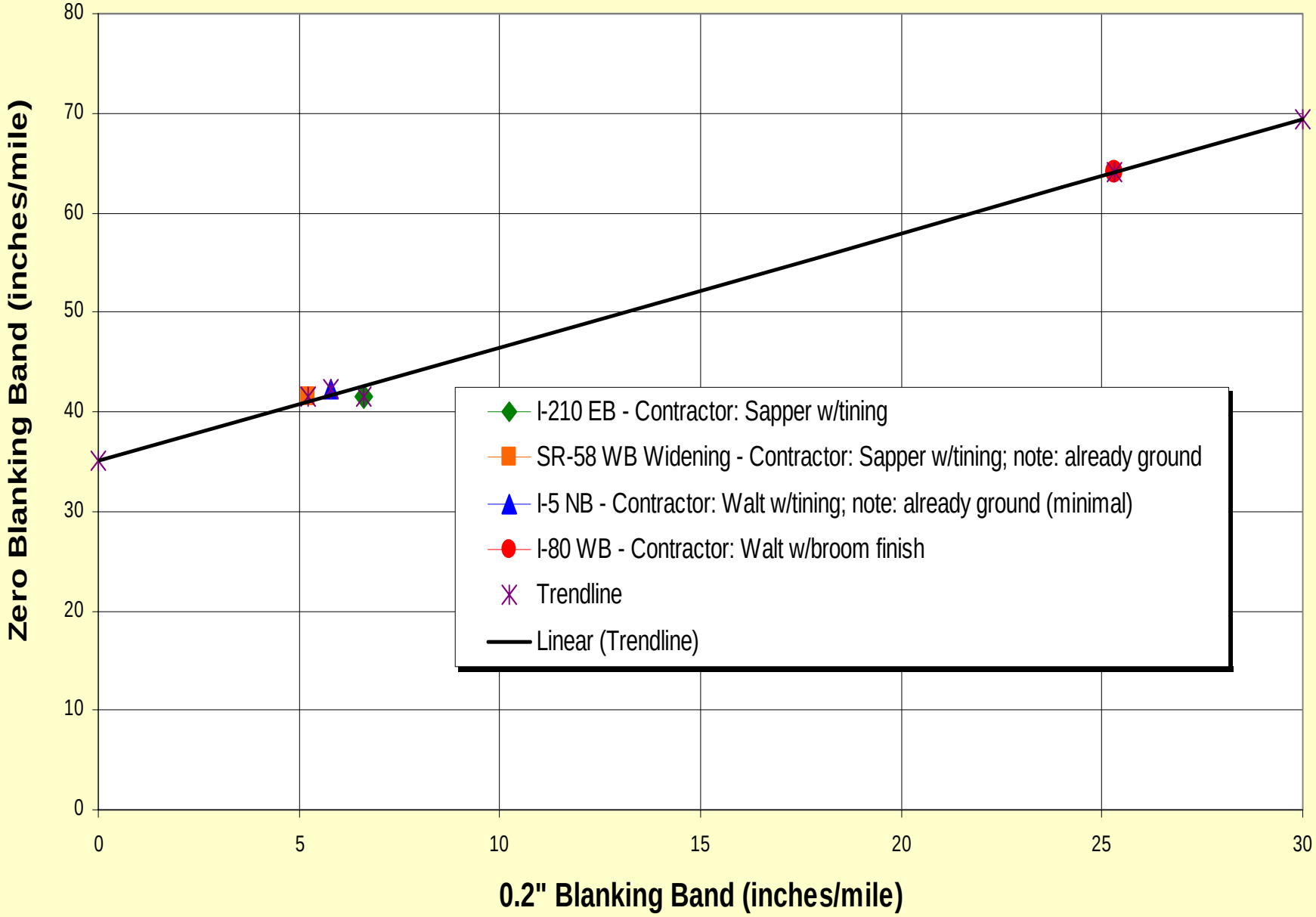
Rt.58 westbound lanes 09-18-02

Note unsightly lane #1 vs. lane #2 texture difference

Rt.58 westbound lanes 09-18-02

Current California PI Values

[Using 2' Butterworth Fileter]



Other States' Current PCC Smoothness Levels Achieved

For example Kansas routinely achieves a PI=0 — usually much better — based on the equivalent 0.2" blanking band PI's used in California (generally well off the graph to the left as shown on the previous slide).

First Step in Implementing New Smoothness Specifications

- Change from a 0.2” (5-mm) blanking band to a zero blanking band.
- This will insure that certain types of roughness are not “masked” by the blanking band.

Profiler System V1.32, Inc.
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Date Paved: 7/27/2001 1:18:00 PM
Date Tested : 3/23/2003 4:26:00 PM

File C:\proscan\Data\eres_unf.ptd

3 Seg 3 Stn: 4+200.0 to 4+299.9

Height Cal - 200 counts in 25.400 mm
Distance Cal - 26 counts per m

Scallop(Moving Average, Width=0.57, Gain=1.000)

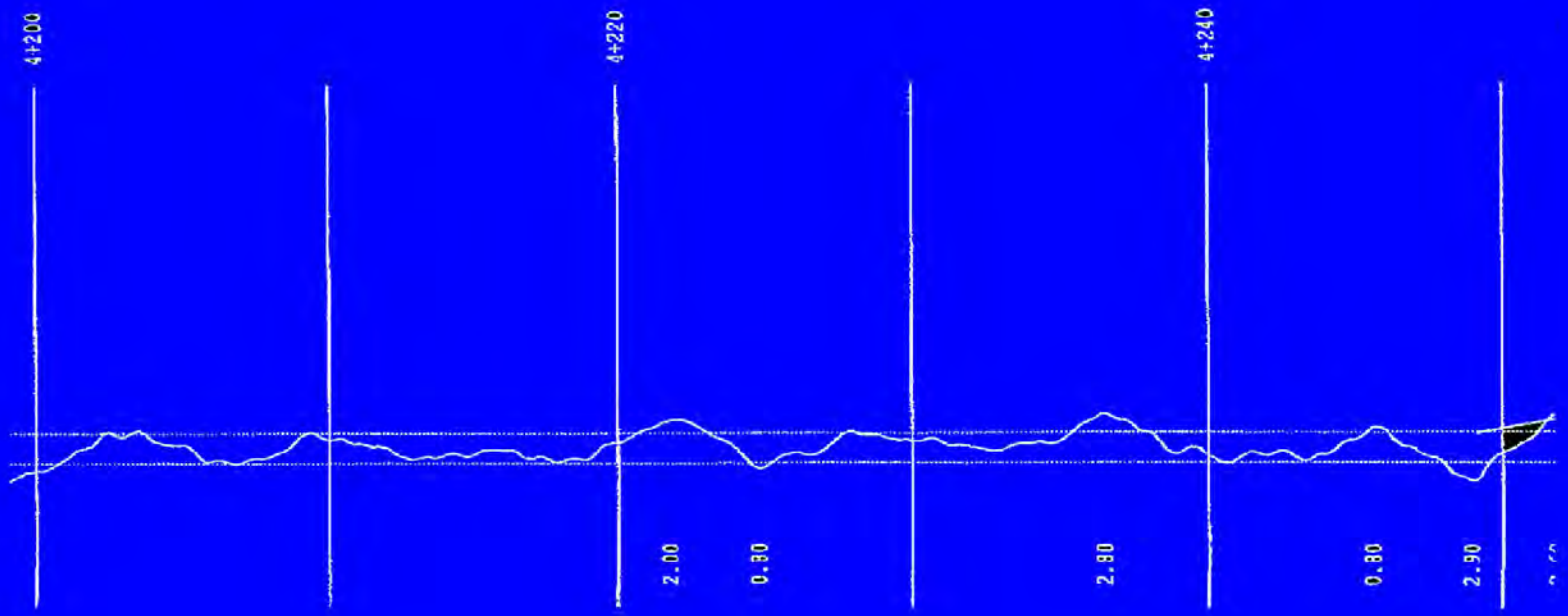
minimum height	0.000	mm
minimum width (300:1)	0.61	m
resolution	0.10	mm
Blanking band	5.08	mm
Defect template height	7.62	mm
Defect template length	7.62	m

Track 3

PRI (mm/km) 155

Defects

Bump 4+251.4
to 4+252.1



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Track 3

PRI (mm/km) 694

Defects

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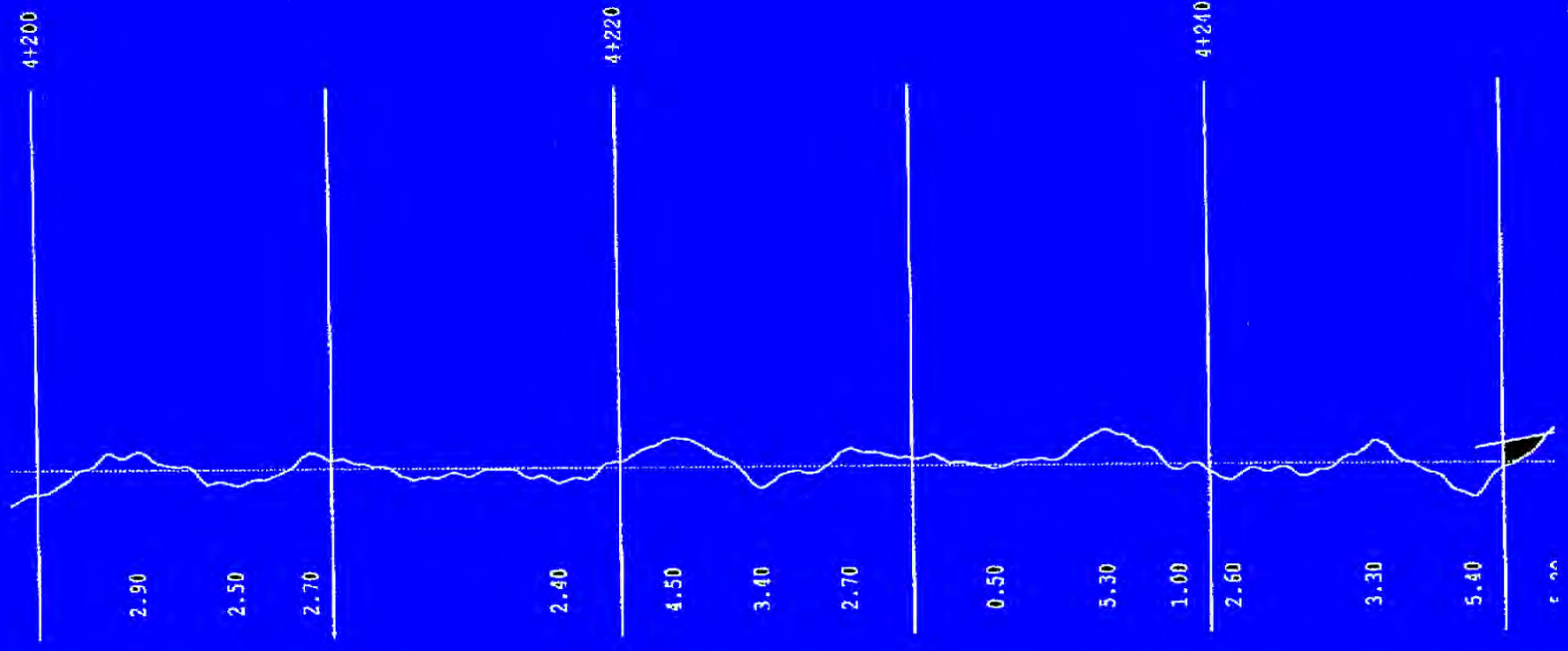
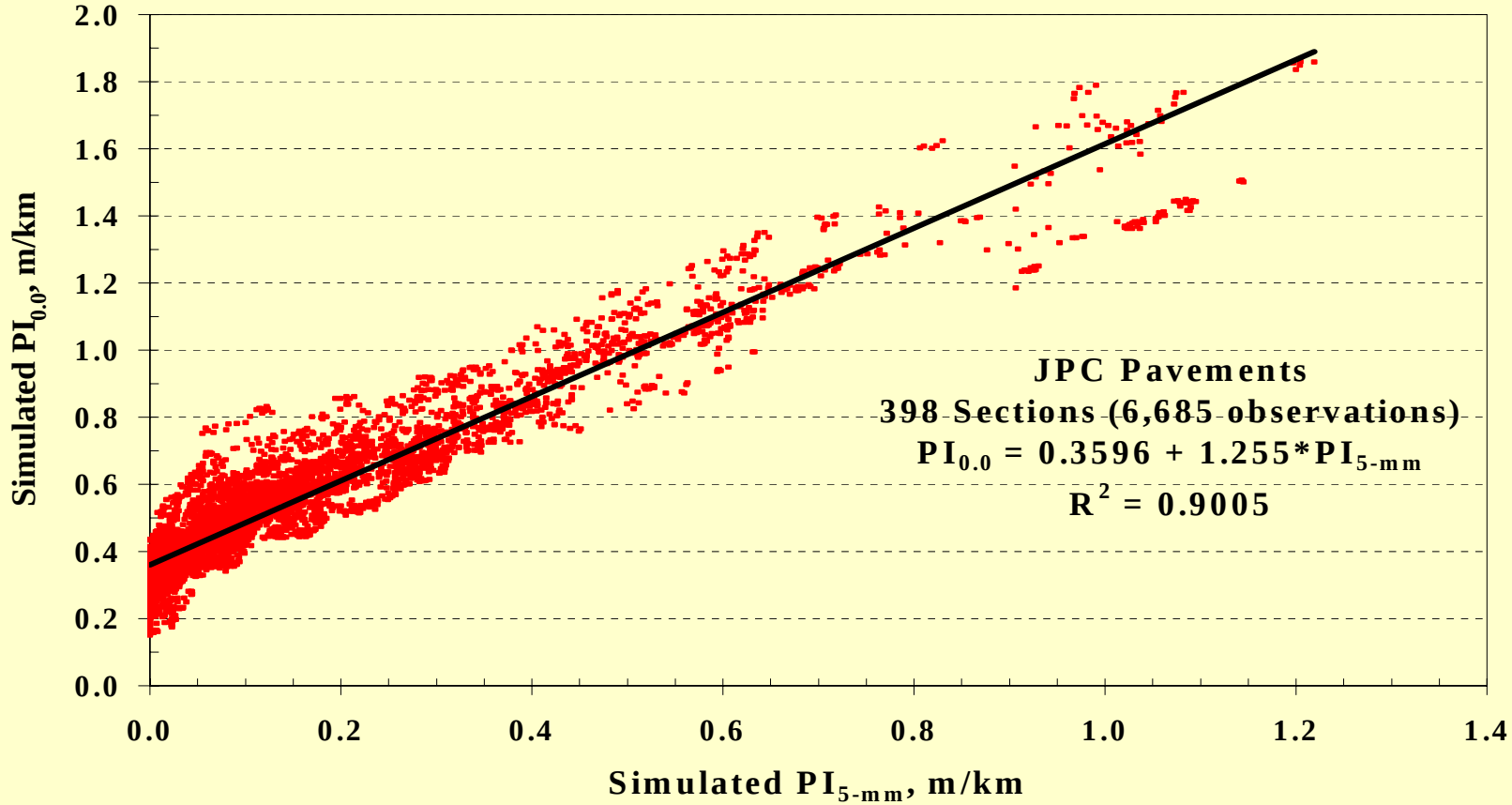
to 4+252.1



Correlation between 0.2” blanking band PI and zero blanking band PI using LTPP smoothness data (2.5’ running average filter)



Smoothness Initiative Specifications

Caltrans specifications are being changed:

- Move from a 0.2 in blanking band to a zero blanking band
- Change California Test Method 526

Types of Roughness Masked by Using a Blanking Band

- Roughness due to “harsh” tining
- Imperfect joint construction
- Relatively small changes in volume due to automatic dowel bar inserters
- Other short wavelength imperfections that can cause an unsmooth ride quality

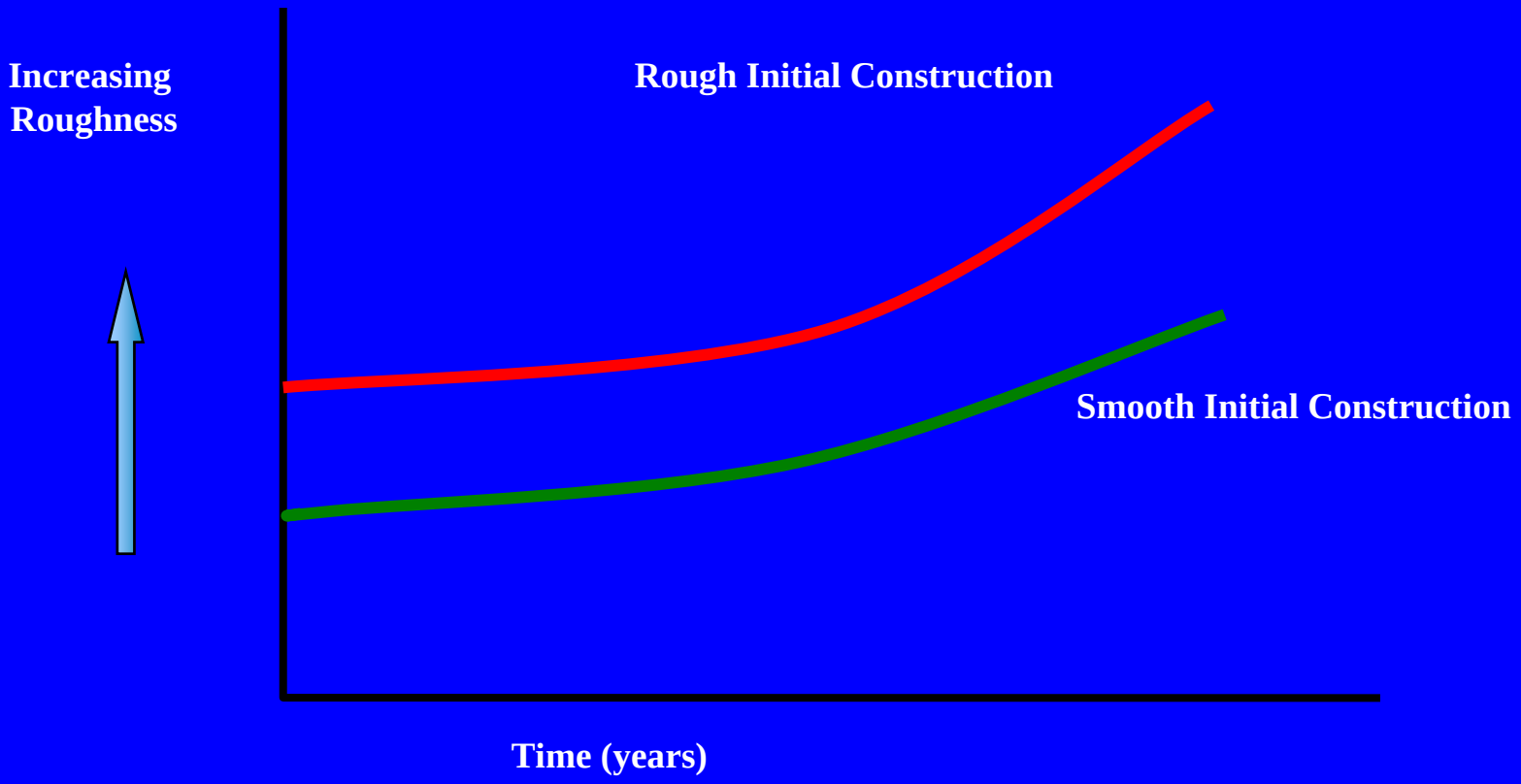
Smoothness Initiative Incentive/Disincentive

- 35 States have some form of an Incentive/ Disincentive specification
- “Incentives” are applied in various ways:
  - Absolute (5-7 in/mi)
  - Percentage improvement (50-70%)
  - Route type (low vs. high speed)
  - Strategy type (one vs. multiple lifts)

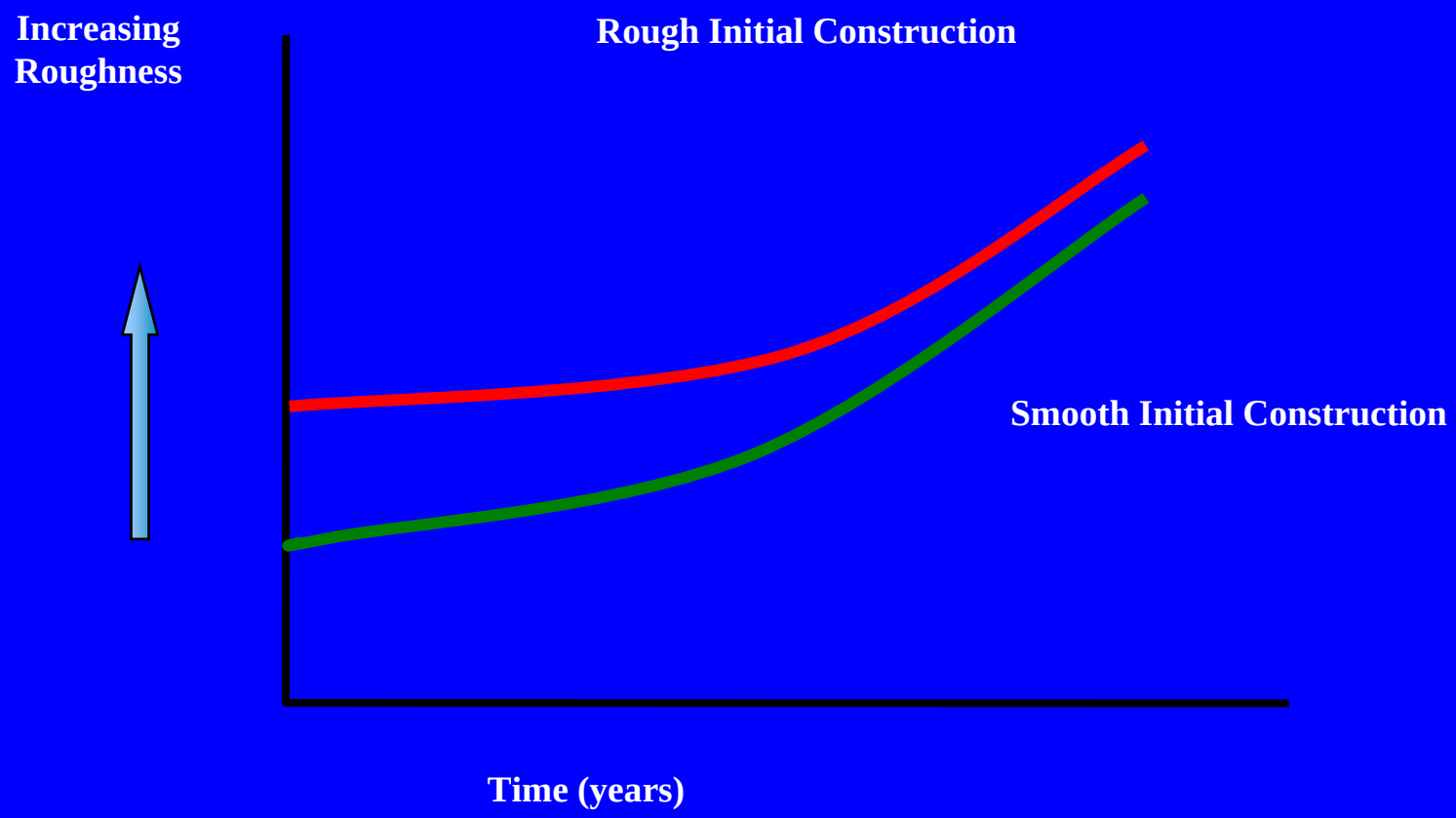
Reasons for Implementing Smoothness Specifications with Incentives & Disincentives

- Higher quality paving operations by qualified contractors
- Small, if any, increase in construction cost
- Better performing/longer lasting pavements
- Better riding pavements (see following slides)

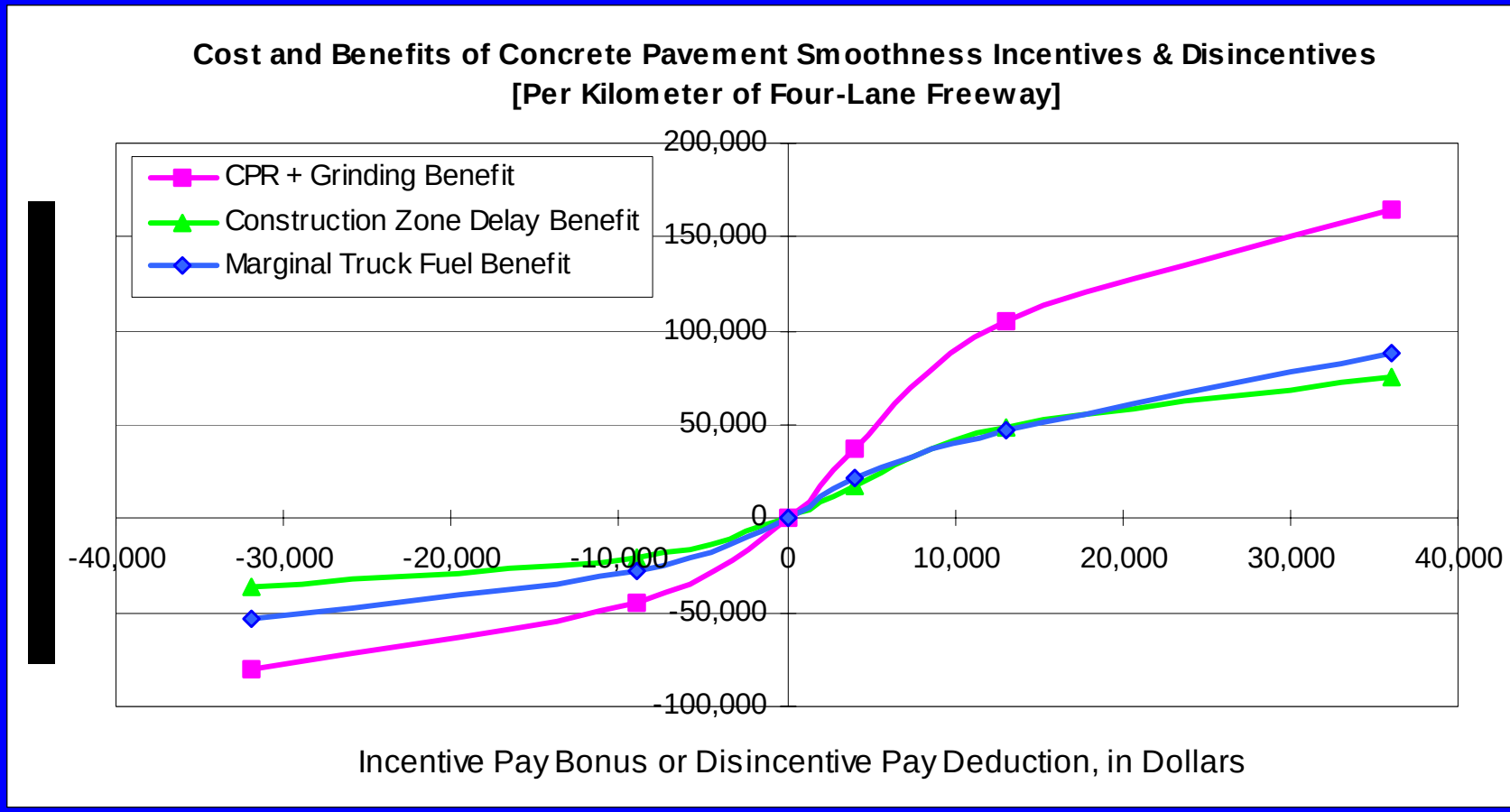
Typical Scenario for Roughness Development Over Time



Another Scenario for Roughness Development Over Time



For smoother PCC construction, the long-term benefits will far outweigh the costs of paying incentives, while disincentives, or penalties, will not make up for the long-term costs.



In summary, when an incentive/disincentive specification is implemented:

- Longer pavement lives will result in:
  - Lower life cycle costs
  - Reduced construction delay costs
  - Fewer work zone accidents & costs thereof
- Lower vehicle operation (user) costs will result in:
  - Reduced fuel consumption
  - Lower vehicle emissions, on average
  - Lower vehicle maintenance costs
  - Reduced cargo damage for trucks
  - Reduced accident rates (likely)