



TMC – Tinni Management Consulting

PAVEMENT INFORMATION NOTE

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Some of the projects that we have completed in the recent years have had excellent roughness readings, whereas a couple of others have finished up well below what might be called acceptable. A lot of in-house evaluations are being conducted to try to establish the reasons. These cover paver operations and comparison of slipforming methods. PIN 21 lists some other the factors that also contribute to the loss of smoothness. I have put this together to illustrate the effects of roughness.

EFFECT OF PAVEMENT ROUGHNESS ON FUEL CONSUMPTION

The following example is based on the ARRB Research Report ARR 314. Based on seven different studies, they have determined that there is an average change in fuel consumption of 1% per unit IRI.

(IRI = International Roughness Index
NRC = NAASRA Roughness Count
1 IRI = 26 NRC)

Example

Assume:

Project length = 10 km
AADT = 30,000
Av fuel consumption = 11 l/100 km (ARRB)
Av fuel cost = \$1.30/ l

Consider two concrete pavements, one with initial roughness of 30 NRC and the other with initial roughness of 70 NRC.

Difference = 40 NRC
40 NRC = 1.5 IRI
Av change in fuel consumption = 1.0% x 1.5 = 1.5%
Av fuel usage / vehicle / 10 km = 11 x 10/100 = 1.1 l

The yearly cost of additional fuel used on the pavement with 70 NRC
= 30,000 x 1.1 x \$1.30 x 365 x 1.5/100
= **\$235,000**

PS ARR 314 also provides estimates of the effect of roughness on total vehicle operating costs (VOCs). On the basis of the above example, they have suggested that this would increase the total operating costs of 4.5% for cars and 8% for trucks