Calculations of Pavement Design for Rock Crusher Use

Typical load from rock crusher = 20 tonnes

Base size of crusher typically 2m x 2m

According to GEO Guide 1 bearing capacity of medium dense soil = 100 kPa

Imposed pressure from crusher (assuming no spread of load which is conservative) = $\frac{200 \times 1.6}{2 \times 2}$ (safety factor of 1.6)

= 80 kPa < 100 kPa **bearing capacity OK**

Concrete shear stress capacity = 0.8 x /fcu or 5N/mm2 whichever is lower

= 5 N/mm2

Actual shear stress = $\frac{200{,}000}{200 \times 4000}$ (0.2m x 4m) = 0.25 MPa < 5 MPa **Shear strength OK**

The bearing capacity and shear for a 200mm thick concrete slab will be sufficient to support the rock crusher use.

	Title: Appendix 2.5		
	Subject: Checking of punching stress		Calc.Sheet No.
	Drawing Ref.	Calculations by: R Li	Checked by: HN	Date: 1-Apr-08

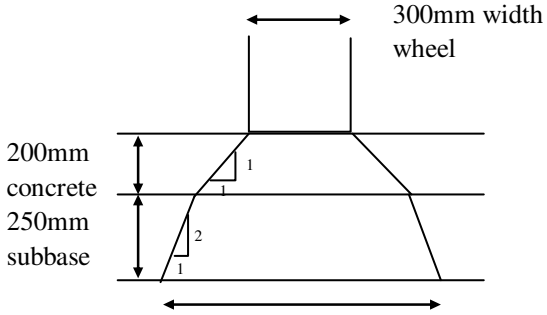
Ref.	Calculation

INTRODUCTION

Checking for punching stress of potential vehicular load against bearing capacity for the pavement design.

DESIGN ASSUMPTION

According to BD 37/01 Clause 6.2.6
load spread on :
1) concrete = 1:1
2) subbase = 1:2



According to GEO Guide 1,
Bearing capacity of medium dense soil as revealed through the previous borelogs =
100 kPa

According to Table 2.2.2.5 of TPDM V.2.2,
Weight of axle load of medium and heavy goods vehicles = 10 tonnes
=> Max. wheel load = **50** kN

CALCULATION

Assume contact area of 300 x 300mm for wheel loading which spreads through the concrete pavement and subbase to the existing subgrade underneath with 950mm x 950mm in dimension as calculated.

Therefore,

$$\text{Imposed pressure} = \frac{50 \times 1.6}{0.95 \times 0.95}$$ (Live load safety factor = 1.6)

= **88.64** kPa < **100** kPa **bearing capacity OK!**

CONCRETE SHEAR

Concrete shear stress = 0.8 x √fcu or 5N/mm2 whichever is lower.
= 5 N/mm2 = MPa
Actual shear stress = **50** kN / 0.2 / 1 (0.2m x 1m)
= 0.25 MPa < **5** MPa **Shear strength OK!**