
*

- - - - -

(/ / / / / / /)

GSI

s m

GSI_m GSI_s

- GSI :

GSI

[]

[]

GSI

s m

[]

φ c

GSI

φ c

[]

(m_b s a)

GSI

GSI

[]

GSI

$$m_b = m_i \cdot \exp\left(\frac{GSI - 100}{b_m}\right) \quad b_m = (16 - 28)$$

()

$$b_m = 3.14 \times \ln\left(\frac{d_f}{d_f + 340(1 - d_f)}\right) + 28$$

()

$$s = \exp\left(\frac{GSI - 100}{b_s}\right) \quad b_s = (6 - 9)$$

(c φ)

()

F

$$b_s = 0.67 \times \ln \frac{d_f}{d_f + 340(1 - d_f)} + 9 \quad ()$$

(G)

$$\begin{aligned} GSI > 30 & \quad a = 0.5 \\ GSI < 30 & \quad a = 0.65 - (GSI / 2000) \end{aligned} \quad ()$$

s, m_b

d_f

m_i

GW

m_b s

/

)

()

(UCS)

m_i

s,

GSI

m_b

(GSI)

GSI

s m_b

[]

GSI

[]

F

[]

$$F = f\{GSI(m_b, S), GW, G\} \quad ()$$

s m_b)

GSI

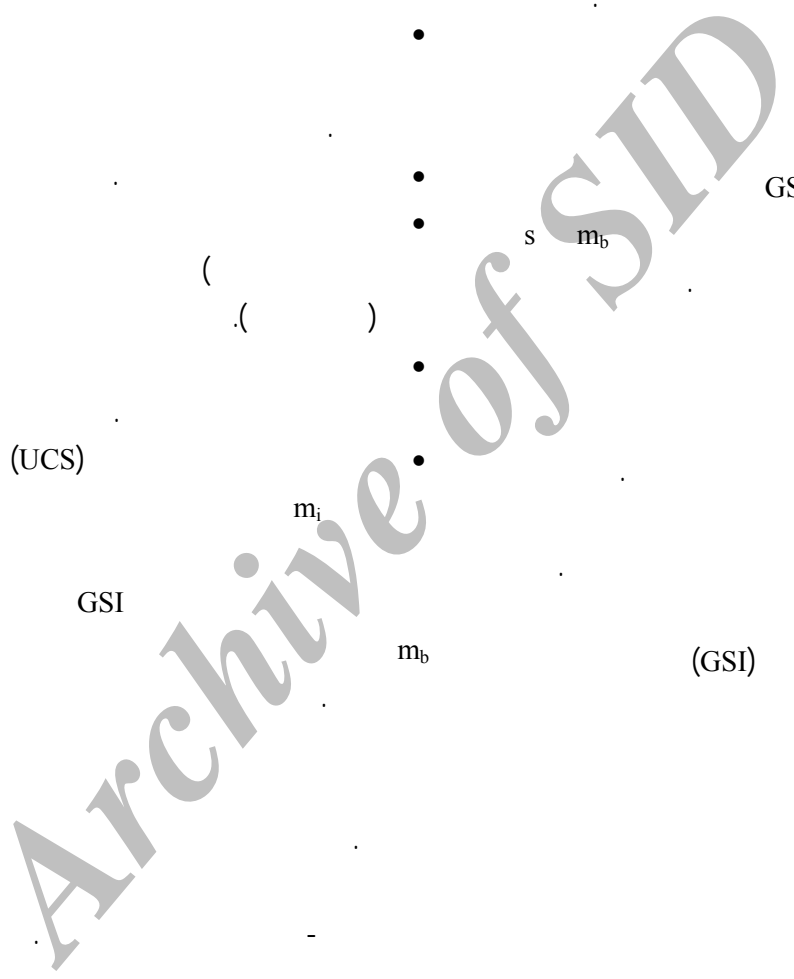
GW (

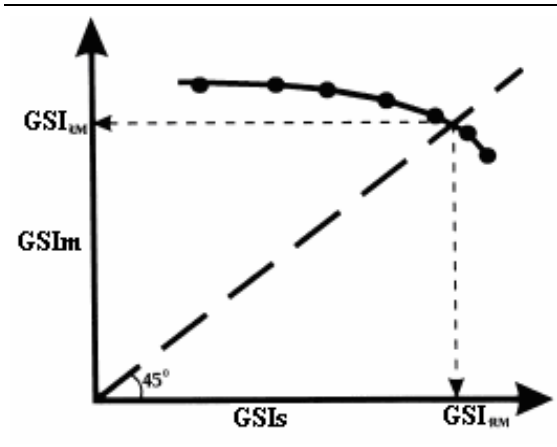
G

GSI

s, m_b

(m_b





GSI (F=) , s)

GSI :
 (GSI , m_b , s)
 () s
)
 GSI ()
 GSI_s s

GeoLink

GeoLink
 GSI

m_b GSI GSI_s (GSI_m)

GSI_s :
 GSI_s GSI_m

Visual c++

GeoLink

[] GeoSlope 6.02

GSI_s GSI_m

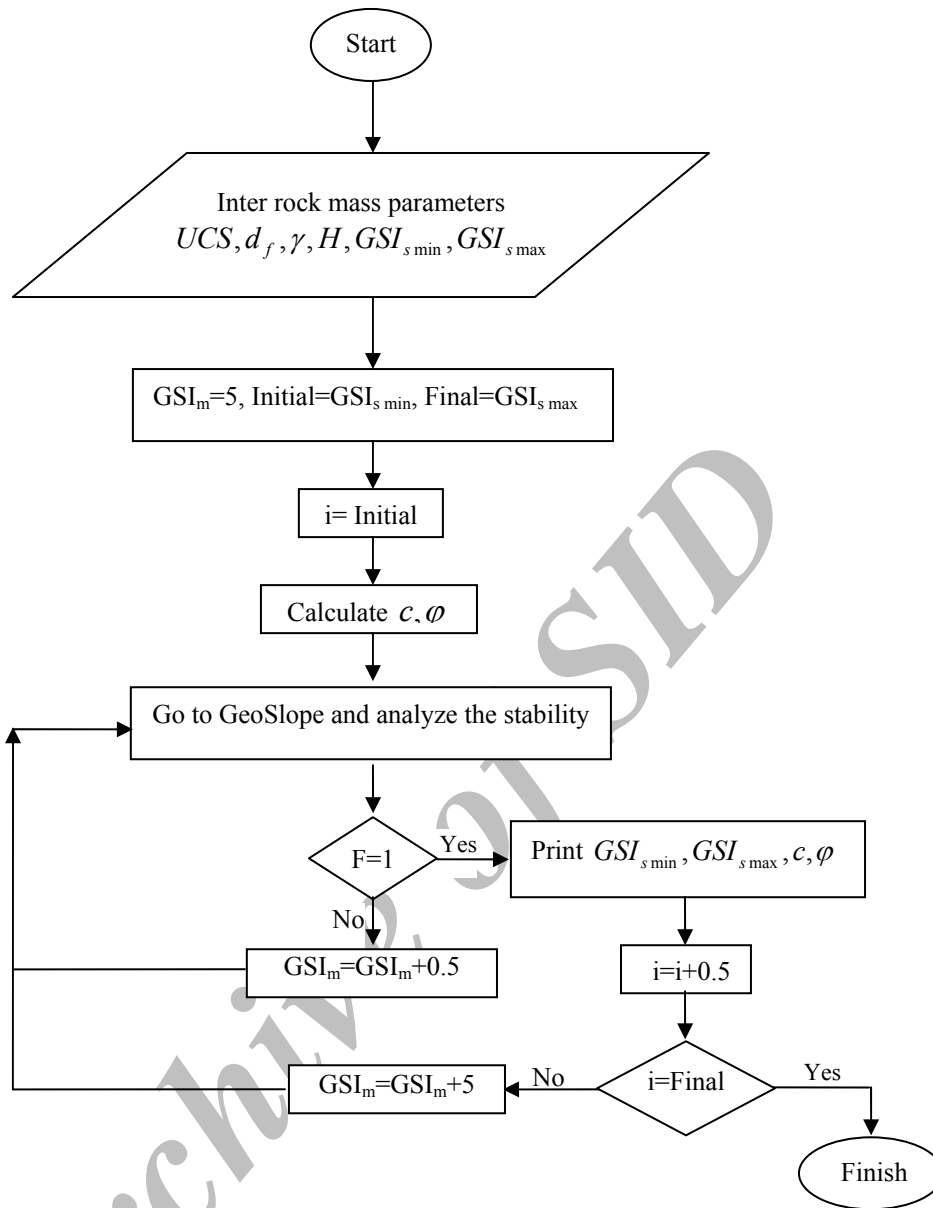
) () (GSI

s m_b GSI

GeoSlope

- d_f •
- γ •
- UCS •
- m_i •
- H •
- GSI_s •

()
 GSI_s-GSI_m
 GSI
 GSI_{RM} GSI
 GSI_{RM}
 s m_b



GeoLink

GeoSlope

c, ϕ GSI_m GSI_s GeoSlope
 geo-temp C GeoLink
 result
 γ $[] d_f$
 m_i UCS

()

()

[]

()

() A-A'

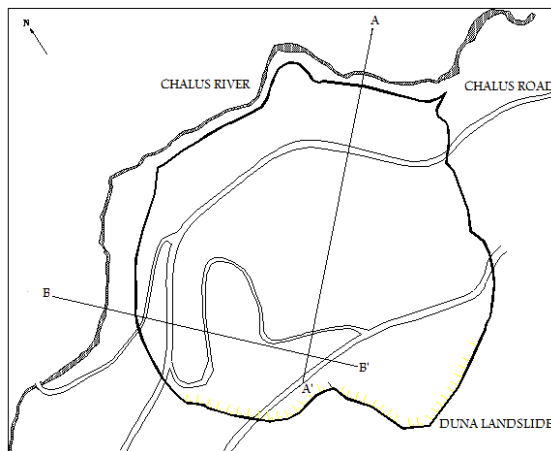
GeoSlope

GeoSlope

GeoLink

m s

(GSI_s, GSI_m)



GSI

GeoLink

()

GeoLink

()

GSI_s GSI_m

B-B'

y=x

GeoLink

()

B-B'

$$GSI_m = GSI_s$$

GeoLink

Geoslope

GSI

()

()

kPa

()

y=x

$$GSI_m = GSI_s$$

GSI

kPa

$\leq F \leq /$

GSI

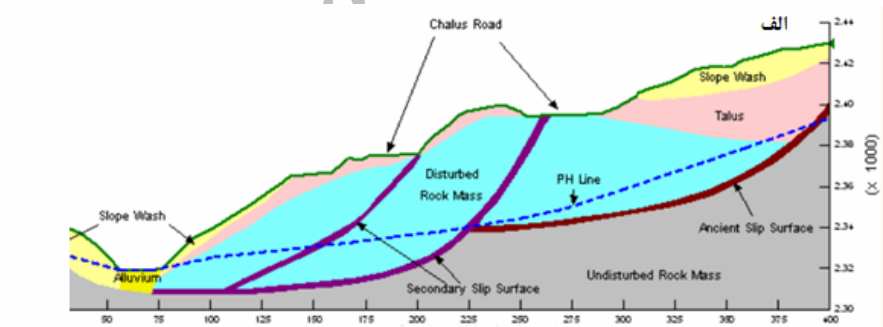
A-A'

B-B'

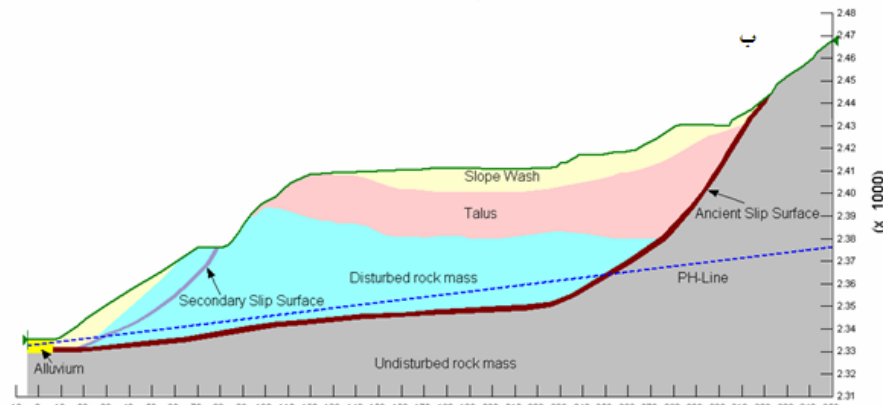
()

GSI

()



Duna Landslide, Section A-A'



Duna Landslide, Section B-B'

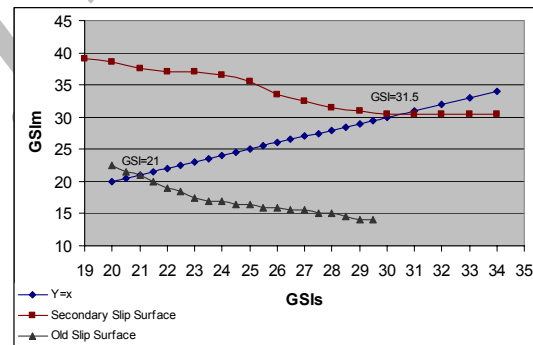
. B-B' : A-A' :

GeoLink

Material	UCS (MPa)	m_i	d_f	Unit weight (kN/m^3)	Slope height (m)	$GSI_{m \min}$	$GSI_{m \max}$
Secondary slip surface	5	6	0.99	26	35,45	5	30
Ancient slip surface	5	6	0.99	26	60	10	40

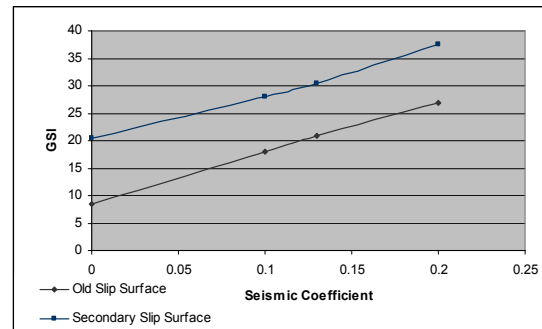
GeoLink

Ancient slip surface		Secondary slip surface 1		Secondary slip surface 2	
GSI_m	GSI_s	GSI_m	GSI_s	GSI_m	GSI_s
35.5	25	33	25	22.5	20
33.5	26	32.5	26	21	21
32.5	27	32	27	19	22
31.5	28	32	28	17.5	23
31	29	31.5	29	16.5	25
30.5	30	30.5	30	16	26
30.5	31	30.5	31	15.5	27
30.5	32	30.5	32	15	28
30.5	33	30.5	33		
30.5	34	30.5	34		
$GSI_m=21$	$GSI_s=21$	$GSI_m=30.5$		$GSI_s=30.5$	



GeoLink

GSI



GSI

(s m GSI)

GSI

(φ c)

- 1 - Sonmez, H. Ulusay, R. and Gokcoeoglu, C. (1997). "A practical procedure for back analysis of slope failures in closely jointed rock masses." *International Journal of Rock Mechanics and Mining Science*, Vol. 35, No. 2, PP. 219-233.
- 2 - Hoek, E. (1995). "Strength of rock and rock masses." *News J. ISRM*, Vol. 2, No. 2, PP.4-16.
- 3 - Laubscher, D. H. (1990). "A geomechanics classification system for the rating of rock mass in mine design." *Journal of South African Institute of Mining and Metallurgy*, Vol. 90, No. 10, PP.257-273.
- 4 - Singh, R. N. and Gahrooe, D. R. (1989). "Application of rock mass weakening coefficient for stability assessment of slopes in heavily jointed rock masses." *International Journal of Surface Mining*, Vol. 3, No. 2, PP. 207-219.
- 5 - Sonmez, H. and Ulusay, R. (1999). "Modifications to the geological strength index (GSI) and their applicability to the stability of slopes." *International Journal of Rock Mechanics and Mining Sciences*, Vol. 36, No. 6, PP. 743-760.
- 6 - Hoek, E., Carranza-Torres, C. T. and Corkum, B. (2002). "Hoek-Brown failure criterion–2002 edition." *Proceeding North American Rock Mechanics Society meeting in Toronto in July*.
- 7 - Krahn, J. (2004). *Slope Stability Modeling with Slope/W*, GEO-SLOPE/W International Ltd.
- 8 - *Upper dam-Duna landslide stability analysis reports*, Siah Bishe Pumped Storage Project, Keyson Construction Company.