STUDIO ASSOCIATO DI GEOLOGIA C. BERETTA & A. PATELLANI
Geologia, Geotecnica e Geomeccanica – Petrografia e Petrografia Applicata
Perizie – Consulenze

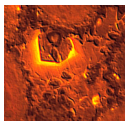


TAVOLA 6

ANALISI GEOMECCANICA – SCHEMI E GRAFICI

INTERVENTO:
Progetto Preliminare per il Ripristino dell'Impianto Miniidroelettrico ad Acqua Fluente Denominato "Filanda" sul Bacino del Torrente Lavagna

UBICAZIONE:
Comuni di Moconesi, Tribogna, Cicagna (GE)

COMMITTENTE: **Per. Ind. Alessandro MARINI** **Dott. Arch. Marco LARI** **Dott. Ing. Barbara TRONCHI**	

RIFERIMENTO: ***BP161_2008***	**DATA:** ***24 Luglio 2008***	**REVISIONE:** ***00***

NOTE:

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TAVOLA 6 ANALISI GEOMECCANICA

CLASSIFICAZIONE GEOMECCANICA
GSI (Geological Strength Index)
Marinos P. & Hoek E. (2002)

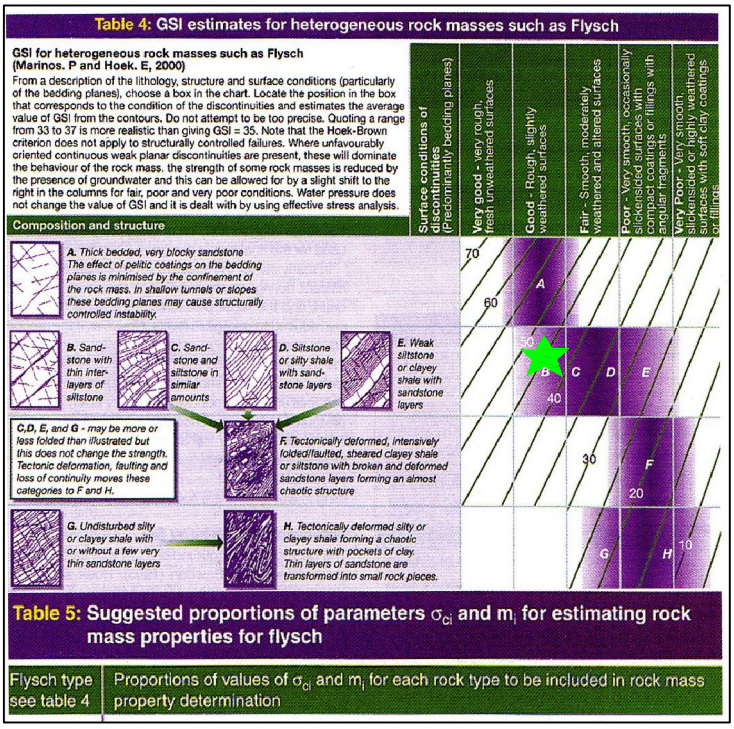


Table 4: GSI estimates for heterogeneous rock masses such as Flysch

GSI for heterogeneous rock masses such as Flysch (Marinos. P and Hoek. E, 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimates the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. the strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

Surface conditions of discontinuities (Predominantly bedding planes)

Very good - very rough, fresh unweathered surfaces

Good - Rough, slightly weathered surfaces

Fair - Smooth, moderately weathered and altered surfaces

Poor - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

Very Poor - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

Composition and structure

A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimised by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.

B. Sand-stone with thin inter-layers of siltstone

C. Sand-stone and siltstone in similar amounts

D. Siltstone or silty shale with sand-stone layers

E. Weak siltstone or clayey shale with sandstone layers

C,D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.

F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure

G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers

H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

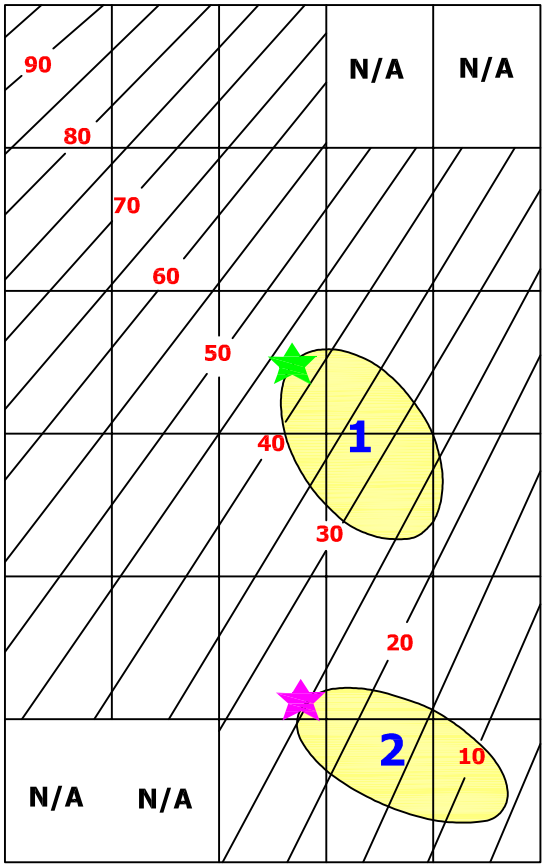
70 60 50 40 30 20 10

A B C D E F G H

Table 5: Suggested proportions of parameters σ_{ci} and m_i for estimating rock mass properties for flysch

Flysch type see table 4	Proportions of values of σ_{ci} and m_i for each rock type to be included in rock mass property determination

CONDIZIONI FAVOREVOLI
GSI = 44



Valori tipici di GSI per argilliti e marne

Siltiti, Argilliti, Argilloscisti, Marne
I campi più probabili indicati con il numero sono:
1 Stratificati, laminati, fratturati
2 Brecciato o frizionati

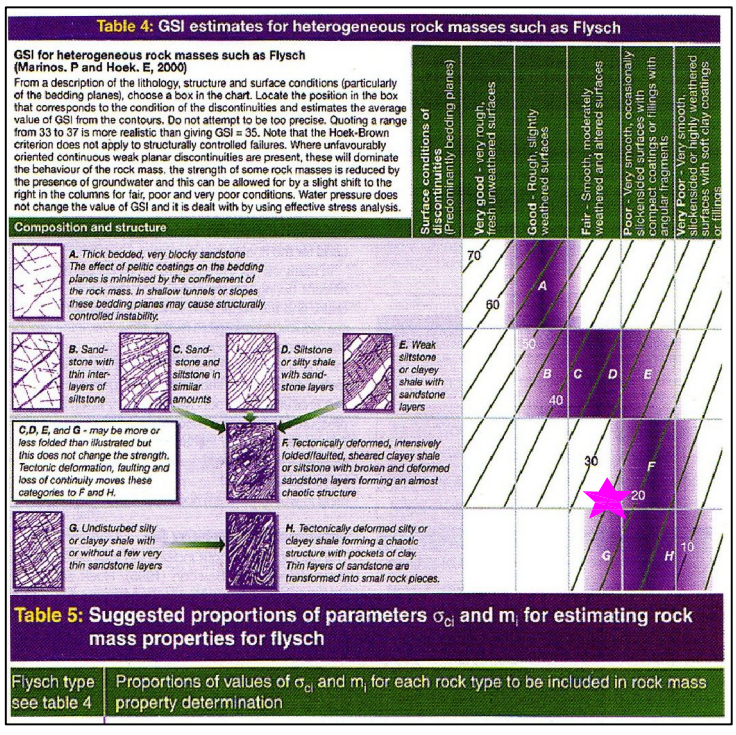


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A B C D E F G H

Table 5: Suggested proportions of parameters σ_{ci} and m_i for estimating rock mass properties for flysch

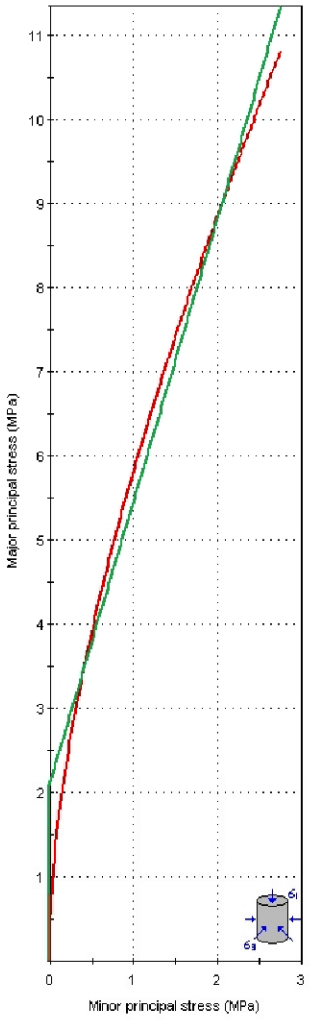
Flysch type see table 4	Proportions of values of σ_{ci} and m_i for each rock type to be included in rock mass property determination

CONDIZIONI SFAVOREVOLI
GSI = 26

PARAMETRIZZAZIONE GEOMECCANICA
Criterio di Hoek E. & Brown T. (2002)

CONDIZIONI FAVOREVOLI

Analysis of Rock Strength using RocLab

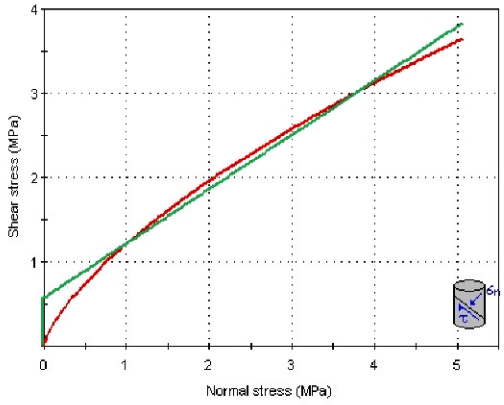


Hoek-Brown Classification
intact uniaxial compressive strength = 11 MPa
GSI = 44 mi = 16 Disturbance factor = 0

Hoek-Brown Criterion
mb = 2.165 s = 0.0020 a = 0.509

Mohr-Coulomb Fit
cohesion = 0.578 MPa friction angle = 32.75 deg

Rock Mass Parameters
tensile strength = -0.010 MPa
uniaxial compressive strength = 0.464 MPa
global strength = 2.118 MPa
modulus of deformation = 5634.95 MPa



PARAMETRIZZAZIONE GEOMECCANICA
Criterio di Hoek E. & Brown T. (2002)

CONDIZIONI SFAVOREVOLI

Analysis of Rock Strength using RocLab

Hoek-Brown Classification
intact uniaxial compressive strength = 3 MPa
GSI = 26 mi = 11 Disturbance factor = 0

Hoek-Brown Criterion
mb = 0.783 s = 0.0003 a = 0.529

Mohr-Coulomb Fit
cohesion = 0.100 MPa friction angle = 24.14 deg

Rock Mass Parameters
tensile strength = -0.001 MPa
uniaxial compressive strength = 0.039 MPa
global strength = 0.310 MPa
modulus of deformation = 1149.20 MPa

