

MARMI s.r.l.

Via Alfio Maggiani 143 – CARRARA (MS)

CAVA FOSSA dei TOMEI

COMUNE DI VAGLI SOTTO (LU)

**PROGETTO DI COLTIVAZIONE DELLA CAVA FOSSA dei TOMEI ai
sensi della LR 35/15 e smi, RICHIESTA DI Autorizzazione
all'esercizio dell'attività estrattiva, Pronuncia di Compatibilità
Ambientale Pronuncia di Valutazione di Incidenza
Nulla osta**

ANALISI DI STABILITA' PREVISIONALE

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Ing. Edoardo Remedi

Ordine Ingegneri Provincia Massa
Carrara n°571

Dott. Geol. Emanuele Sirgiovanni

Ordine Geologi Toscana n°654

PhD Geol. Luca Vaselli

Ordine Geologi Toscana n°1714

La Ditta

MARMI s.r.l. Il Legale

Rappresentante

1 -VALUTAZIONI PREVISIONALI COLTIVAZIONE IN SOTTERRANEO

L'analisi di stabilità è stata mirata all'individuazione delle caratteristiche geometriche dei blocchi (cunei e/o prismi) cinematicamente possibili, ovvero alla definizione di quali set di fratture che, se contemporaneamente presenti, lungo le pareti e/o al tetto dei sotterranei in progetto, sono in grado di determinare l'isolamento di masse potenzialmente instabili.

L'analisi è stata effettuata utilizzando il software UNWEDGE della ROCSCIENCE che permette di determinare tutti i possibili blocchi che possono formarsi in conseguenza dell'intersezione tra un sistema di n.3 discontinuità e una determinata geometria del sotterraneo.

In genere, all'interno di un ammasso roccioso le porzioni "elementari" di roccia cinematicamente possibili hanno una forma tetraedrica (i.e. risultato dell'intersezione tra n.3 discontinuità e la superficie di scavo/affioramento), tuttavia masse instabili di forma prismatica si possono comunemente formare, specie quando sono presenti n. 2 superfici di frattura con direzioni molto simili.

Le principali assunzioni fatte dal programma UNWEDGE sono di seguito riportate:

1. l'ammasso roccioso ha comportamento rigido e le discontinuità sono persistenti (i.e. continue) all'interno del volume di interesse;
2. non si creano fratture di neoformazione indotte da stress (i.e. no stress-induced failure);
3. lo spostamento dei blocchi instabili avviene lungo i piani di discontinuità, ed i blocchi si muovono come corpi rigidi senza subire deformazioni o rotture interne;
4. i blocchi potenzialmente instabili di forma tetraedrica (cunei) e/o prismatica e sono definiti da un sistema di n. 3 discontinuità;
5. nel caso siano presenti un numero di set di discontinuità superiore a 3 sono analizzate tutte le combinazioni possibili;
6. tutte le discontinuità sono di forma perfettamente planare;
7. le discontinuità possono essere localizzate in qualsiasi zona del sotterraneo;
8. la sezione del sotterraneo si mantiene costante lungo la direzione di sviluppo dello stesso;
9. i blocchi potenzialmente instabili sono soggetti al solo carico gravitazionale (i.e. no stress field), o alternativamente, possono essere considerati nel calcolo gli effetti del campo di stress in situ (i.e. effect of in-situ stress) o del sisma;

Attraverso l'applicazione della teoria dei blocchi ("Block Theory and Its Application to Rock Engineering" di Goodman and Shi; 1985) il software determina, a partire dalla giacitura dei set di discontinuità e delle caratteristiche geometriche del sotterraneo, se un determinato cuneo/prisma è in condizioni geometriche per muoversi liberamente dalla massa rocciosa.

Viene quindi definita la direzione di movimento (i.e. direzione di scivolamento) sulla base della risultante delle forze attive agenti sul blocco (vettore A). Le forze passive (vettore P) non influenzano la direzione di movimento.

L'algoritmo di calcolo si basa su quanto riportato la cap. 9 del volume "Block Theory and its application to rock engineering" (Goodman and Shi; 1985).

Per un blocco di forma tetraedrica esistono n. 7 possibili direzioni ($s_0, s_1, s_2, s_3, s_{12}, s_{13}, s_{23}$), le quali rappresentano n.3 possibili modalità di scivolamento: (1) distacco completo (falling/lifting - s_0), (2) scivolamento su di una singola superficie di discontinuità (s_1, s_2, s_3), e (3) scivolamento lungo la linea di intersezione tra n.2 superfici di discontinuità (s_{12}, s_{13}, s_{23}). Il calcolo avviene attraverso due step: nel primo si calcolano tutte le possibili direzioni di scivolamento e nel secondo si determina, in base alla risultante delle forze attive agenti sul blocco, quali tra le possibili direzioni individuate sono effettivamente valide oppure no.

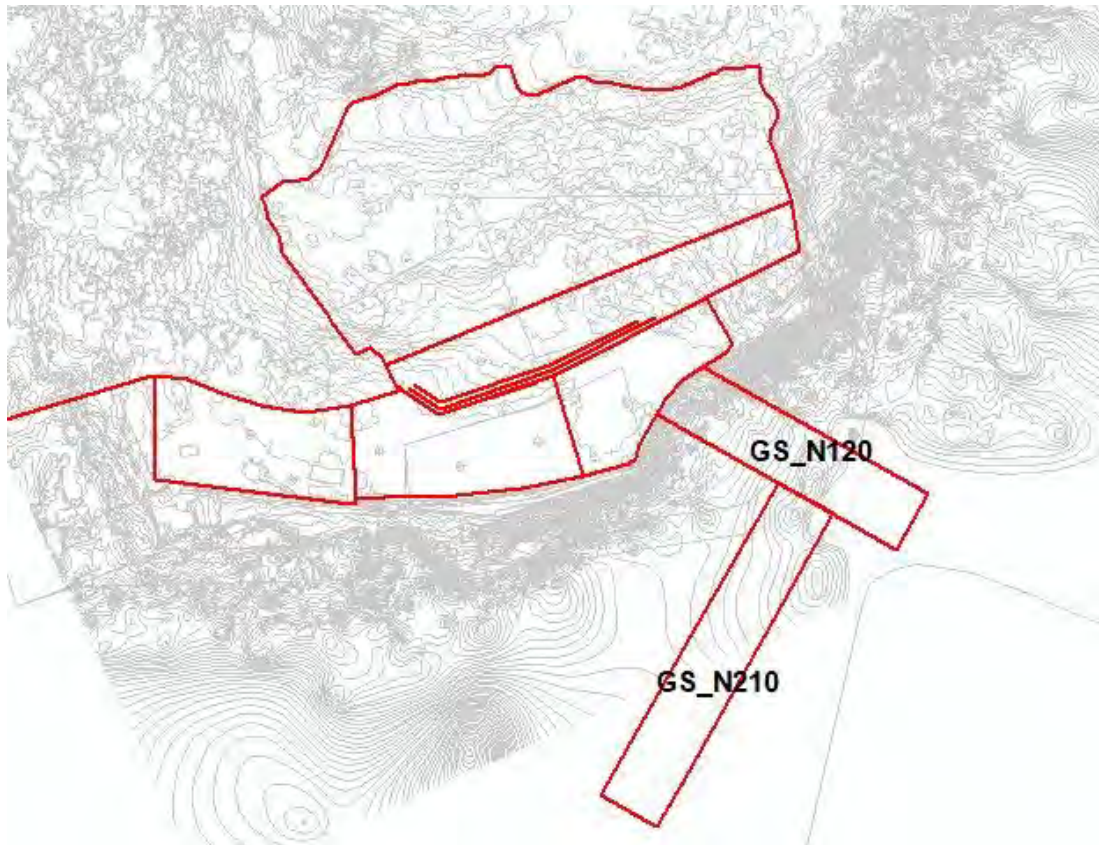
A questo punto il programma calcola per le direzioni di movimento valide le forze normali agenti su ciascuna delle discontinuità che definiscono il blocco e quindi i relativi valori di sforzo normale e di resistenza al taglio mobilitata.

Viene poi calcolato per tutte le direzioni di movimento individuate il valore del rapporto tra le forze resistenti e forze destabilizzanti che si generano su ciascuna superficie di discontinuità e calcolato il relativo fattore di sicurezza come somma dei contributi dati da ogni superficie di discontinuità.

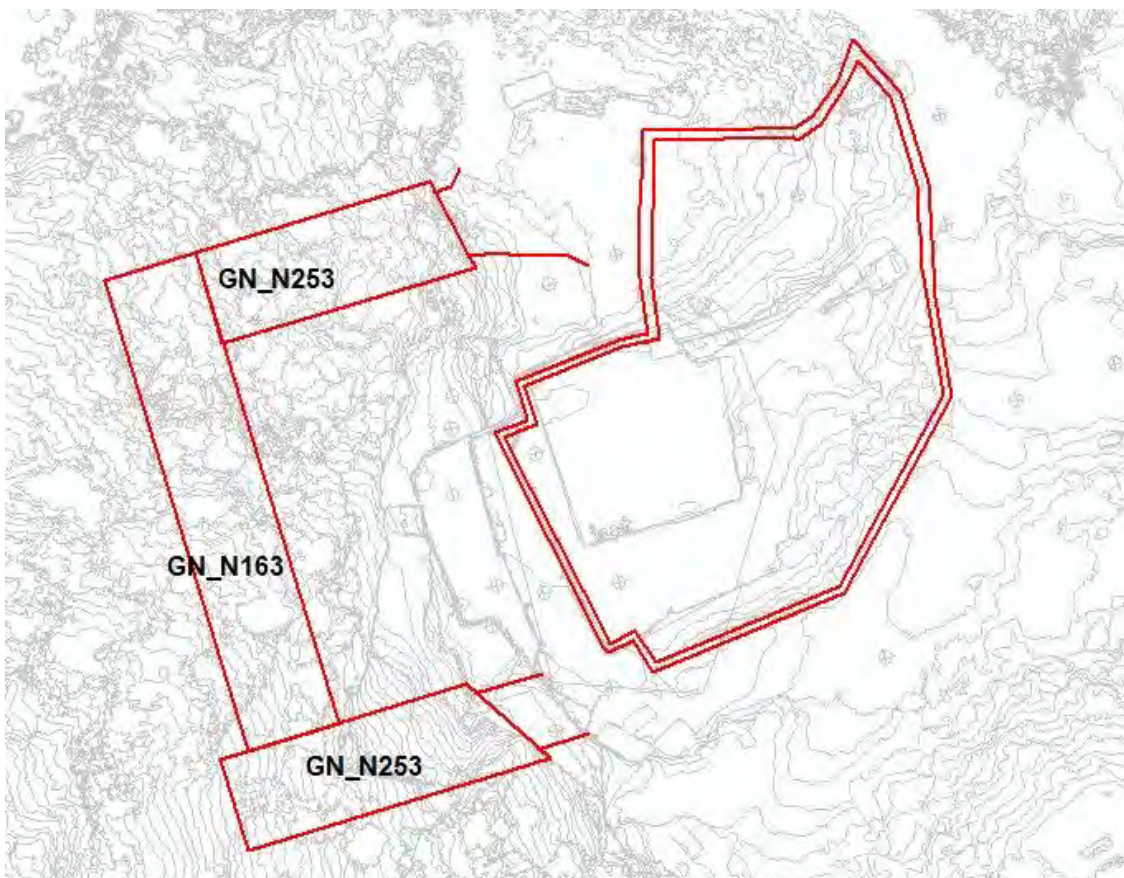
La direzione di movimento per la quale si riscontra il fattore di sicurezza più basso definisce quindi la modalità di scivolamento ed il grado di stabilità del blocco potenzialmente instabile.

2 - DATI GEOMETRICI E PARAMETRI GEOMECCANICI E SISMICI UTILIZZATI

Nel caso in esame l'analisi è stata condotta tenendo conto dell'orientazione e geometria delle sezioni delle gallerie di progetto (Galleria Sud, Cantiere superiore e Galleria Nord – cantiere inferiore).



Cantiere Superiore



Cantiere inferiore

I parametri di resistenza delle discontinuità sono stati derivati dalla caratterizzazione geomeccanica delle discontinuità come riportata nell'apposito elaborato.

In particolare, sensi delle NTC-18, i valori di progetto dei parametri di resistenza al taglio delle discontinuità sono stati definiti applicando i relativi coefficienti riduttivi ai valori di angolo di attrito e coesione minimi come stimati dallo studio geomeccanico effettuato.

SISTEMA	STATO TENSIONALE	$\phi_{K,P}$	M2	TAN $\phi_{K,P}$	ϕ'_d	$c_{K,P}$ kPa	M2	c'_d kPa
K1a	6m	36.2	1,25	0,585	30,3	0,3	1,25	0,24
	20m	35.2	1,25	0,564	29,4	0,9	1,25	0,72
K1b	6m	36.8	1,25	0,598	30,9	0,1	1,25	0,08
	20m	35.8	1,25	0,577	30,0	0,4	1,25	0,32
K2	6m	34.9	1,25	0,558	29,2	1,2	1,25	0,96
	20m	33.9	1,25	0,537	28,3	3,8	1,25	3,04
K3	6m	35.7	1,25	0,575	29,9	0,5	1,25	0,40
	20m	34.6	1,25	0,552	28,9	1,6	1,25	1,28
K4	6m	34.9	1,25	0,558	29,2	1,1	1,25	0,88
	20m	33.9	1,25	0,537	28,3	3,7	1,25	2,96
K5	6m	34.9	1,25	0,558	29,2	1,2	1,25	0,96
	20m	33.8	1,25	0,535	28,2	4,0	1,25	3,20
K6	6m	34.6	1,25	0,552	28,9	1,6	1,25	1,28
	20m	33.6	1,25	0,531	28,0	5.2	1,25	4.2

Inoltre, è stato assunto, cautelativamente, un valore nullo per la coesione.

Per la definizione dei coefficienti sismici si è fatto ricorso al software GeostruPS, ipotizzando una categoria di suolo di tipo A e una categoria topografica T4; il relativo output è riportato di seguito.

Parametri sismici

Tipo di elaborazione: Stabilità dei pendii

Sito in esame.

latitudine: 44,096513

longitudine: 10,251769

Classe: 2

Vita nominale:50

Siti di riferimento

Sito 1	ID: 18490	Lat: 44,0895	Lon: 10,2189	Distanza: 2740,778
Sito 2	ID: 18491	Lat: 44,0914	Lon: 10,2883	Distanza: 2973,185
Sito 3	ID: 18269	Lat: 44,1414	Lon: 10,2857	Distanza: 5678,951
Sito 4	ID: 18268	Lat: 44,1395	Lon: 10,2162	Distanza: 5559,798

Parametri sismici

Categoria sottosuolo:	A
Categoria topografica:	T4
Periodo di riferimento:	50anni
Coefficiente cu:	1

Operatività (SLO):

Probabilità di superamento:	81	%
Tr:	30	[anni]
ag:	0,055	g
Fo:	2,442	
Tc*:	0,241	[s]

Danno (SLD):

Probabilità di superamento:	63	%
Tr:	50	[anni]
ag:	0,071	g
Fo:	2,436	
Tc*:	0,254	[s]

Salvaguardia della vita (SLV):

Probabilità di superamento:	10	%
Tr:	475	[anni]
ag:	0,182	g
Fo:	2,414	
Tc*:	0,282	[s]

Prevenzione dal collasso (SLC):

Probabilità di superamento:	5	%
Tr:	975	[anni]
ag:	0,234	g
Fo:	2,420	
Tc*:	0,287	[s]

Coefficienti Sismici Fronti di scavo e rilevati

SLO:

Ss:	1,000
Cc:	1,000
St:	1,400
Kh:	0,000
Kv:	0,000
Amax:	0,761
Beta:	0,000

SLD:

Ss:	1,000
Cc:	1,000
St:	1,400
Kh:	0,047
Kv:	0,023
Amax:	0,978
Beta:	0,470

SLV:

Ss:	1,000
Cc:	1,000
St:	1,400
Kh:	0,097
Kv:	0,048
Amax:	2,493
Beta:	0,380

SLC:

Ss:	1,000
Cc:	1,000
St:	1,400
Kh:	0,000
Kv:	0,000
Amax:	3,209
Beta:	0,000

Le coordinate espresse in questo file sono in ED50

Geostru

Coordinate WGS84	
latitudine:	44.095555
longitudine:	10.250758

3 - RISULTATI OTTENUTI

Per ogni combinazione dei set di discontinuità analizzata, il layout fornito dal programma di calcolo utilizzato riporta le caratteristiche geometriche (coordinate x-y-z, volume etc.) dei blocchi cinematicamente possibili, la relativa posizione rispetto alle pareti ed il tetto del sotterraneo, la direzione e modalità di scivolamento ed il fattore di sicurezza (Fs) definito dal rapporto tra le forze resistenti (resistenza al taglio/trazione lungo il piano di discontinuità) e le forze esterne destabilizzanti.

In considerazione delle assunzioni fatte dal programma utilizzato a riguardo della persistenza/continuità, morfologia e distribuzione delle fratture all'interno dell'ammasso roccioso, e ricordato inoltre che le giaciture dei set di discontinuità considerati nell'analisi derivano da una trattazione statistica dei dati geostrutturali raccolti in sito, è evidente che i risultati ottenuti devono essere valutati come indicativi delle possibili geometrie dei blocchi potenzialmente amovibili che si possono formare lungo le pareti e/o al tetto delle gallerie di progetto.

Durante le singole fasi di avanzamento delle gallerie dovrà, quindi, essere svolta una costante attività di rilievo delle discontinuità effettivamente intercettate dal sotterraneo, ponendo particolare attenzione al riconoscimento di quelle geometrie individuate dall'analisi svolta

come cunei/prismi potenzialmente amovibili caratterizzati da fattori di sicurezza prossimi o inferiori a 1, verificandone quindi (in questo caso seguendo un approccio di tipo deterministico) le effettive condizioni di stabilità (fattore di sicurezza – Fs) ed eventualmente progettare i necessari interventi di consolidamento e/o disgaggio.

3.1 – GALLERIA SUD DIREZIONE N210

Tetto

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K3	K5	0		162.522	m3
2	K2	K4	K5	0		157.644	m3
3	K2	K3	K5	0		157.445	m3
4	K2	K5	K6	0		110.651	m3
5	K1a	K5	K6	0		104.893	m3
6	K1b	K2	K5	0		87.864	m3
7	K1a	K4	K5	0		73.521	m3
8	K1a	K1b	K3	0		3.58	m3
9	K1a	K1b	K6	0		3.38	m3
10	K1a	K1b	K4	0		2.751	m3
11	K1a	K1b	K2	0		2.696	m3

Parete NW

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K2	K3	0.062		103.517	m3
2	K2	K3	K5	0.347		4.179	m3
3	K1a	K4	K5	0.347		17.526	m3
4	K2	K4	K5	0.347		5.437	m3
5	K1a	K3	K5	0.347		4.259	m3
6	K1b	K2	K6	0.369		214.352	m3
7	K1b	K5	K6	0.369		12.254	m3
8	K2	K4	K6	0.369		207.33	m3
9	K4	K5	K6	0.369		6.584	m3
10	K1a	K1b	K6	0.398		9.951	m3
11	K1a	K4	K6	0.398		155.921	m3
12	K1a	K3	K4	0.4		2.375	m3
13	K2	K3	K4	0.4		5.291	m3
14	K1b	K2	K5	0.632		5.196	m3
15	K1a	K1b	K5	0.632		32.605	m3
16	K1b	K2	K4	1.761		85.003	m3
17	K1a	K1b	K4	1.761		12.392	m3
18	K1a	K1b	K2	3.267		27.631	m3
19	K2	K3	K6	14.765		20.891	m3
20	K1a	K3	K6	14.765		5.283	m3

21	K1b	K3	K4	stable		108.836	m3
22	K3	K5	K6	stable		42.043	m3
23	K1b	K3	K6	stable		1.09	m3
24	K3	K4	K6	stable		1.087	m3

Parete SE

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K3	K5	0.136		4.259	m3
2	K1a	K3	K6	0.136		5.283	m3
3	K1a	K3	K4	0.136		2.375	m3
4	K1b	K3	K6	0.259		1.09	m3
5	K1b	K3	K4	0.259		108.836	m3
6	K2	K3	K6	0.324		20.891	m3
7	K2	K3	K5	0.324		4.179	m3
8	K2	K3	K4	0.324		5.291	m3
9	K1b	K5	K6	0.347		12.254	m3
10	K3	K4	K6	0.427		1.087	m3
11	K4	K5	K6	0.558		6.584	m3
12	K2	K4	K5	1.415		5.437	m3
13	K1a	K4	K5	2.079		17.526	m3
14	K3	K5	K6	3.736		41.553	m3
15	K1b	K2	K5	3.789		5.196	m3
16	K1a	K1b	K2	14.985		27.631	m3
17	K1a	K1b	K6	14.985		9.951	m3
18	K1a	K1b	K4	14.985		12.392	m3
19	K1b	K2	K6	stable		204.043	m3
20	K2	K4	K6	stable		171.888	m3
21	K1a	K4	K6	stable		148.105	m3
22	K1b	K2	K3	stable		103.517	m3
23	K1b	K2	K4	stable		46.649	m3
24	K1a	K1b	K5	stable		32.605	m3

Parete in avanzamento verso SW

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K2	K3	0.127		0.837	m3
2	K1a	K3	K5	0.127		1.066	m3
3	K1a	K3	K4	0.127		1.047	m3
4	K1a	K1b	K3	0.127		0.605	m3
5	K1a	K3	K6	0.127		0.781	m3
6	K2	K3	K4	0.625		9.002	m3
7	K2	K3	K5	0.625		10.451	m3
8	K1b	K2	K3	0.625		2.442	m3
9	K2	K3	K6	0.625		0.995	m3

10	K1b	K3	K5	0.632		2.252	m3
11	K1b	K5	K6	0.632		6.815	m3
12	K1a	K1b	K5	0.632		8.602	m3
13	K1b	K4	K5	0.632		5.382	m3
14	K1b	K2	K5	0.632		8.92	m3
15	K1a	K2	K5	0.865		9.252	m3
16	K1a	K5	K6	0.865		6.531	m3
17	K1a	K4	K5	0.865		10.562	m3
18	K2	K4	K5	1.44		14.923	m3
19	K2	K5	K6	1.44		1.36	m3
20	K1a	K1b	K2	14.985		13.944	m3
21	K1a	K1b	K6	14.985		6.596	m3
22	K1a	K1b	K4	14.985		26.311	m3
23	K3	K4	K6	stable		25.672	m3
24	K1b	K2	K4	stable		21.74	m3
25	K4	K5	K6	stable		21.159	m3
26	K3	K4	K5	stable		16.802	m3
27	K1b	K4	K6	stable		16.549	m3
28	K1a	K4	K6	stable		15.15	m3
29	K1b	K3	K4	stable		6.053	m3
30	K3	K5	K6	stable		4.94	m3
31	K1a	K2	K4	stable		4.852	m3
32	K1b	K3	K6	stable		3.931	m3
33	K2	K4	K6	stable		1.717	m3
34	K1b	K2	K6	stable		1.469	m3
35	K1a	K2	K6	stable		1.361	m3

3.2 – GALLERIA SUD DIREZIONE N120

Tetto

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K3	K5	0.092		15.71	m3
2	K1b	K4	K5	0.092		91.216	m3
3	K1b	K5	K6	0.092		10.43	m3
4	K1a	K2	K5	0.127		20.992	m3
5	K1a	K2	K3	0.127		0.837	m3
6	K1a	K1b	K3	0.127		0.605	m3
7	K1a	K3	K5	0.127		1.066	m3
8	K1a	K3	K4	0.127		1.047	m3
9	K1a	K3	K6	0.127		0.781	m3
10	K4	K5	K6	0.4		61.207	m3
11	K2	K3	K5	0.625		10.451	m3
12	K2	K3	K4	0.625		9.002	m3
13	K2	K3	K6	0.625		0.995	m3

Parete SW

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K2	K3	0.062		17.716	m3
2	K2	K5	K6	0.369		1.36	m3
3	K2	K4	K6	0.369		163.897	m3
4	K1b	K2	K6	0.369		31.398	m3
5	K1a	K5	K6	0.398		6.531	m3
6	K1a	K1b	K6	0.398		6.596	m3
7	K1a	K4	K6	0.398		146.843	m3
8	K1b	K4	K5	0.632		5.382	m3
9	K1b	K3	K5	0.632		2.252	m3
10	K1a	K1b	K5	0.632		15.592	m3
11	K1b	K2	K5	0.632		8.92	m3
12	K1a	K1b	K4	1.761		26.311	m3
13	K1b	K2	K4	1.761		17.498	m3
14	K1a	K1b	K2	3.267		13.944	m3
15	K1b	K3	K4	stable		86.931	m3
16	K3	K4	K6	stable		30.076	m3
17	K3	K5	K6	stable		5.108	m3
18	K1b	K3	K6	stable		4.775	m3

Parete NE

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K2	K3	0.062		17.716	m3
2	K2	K5	K6	0.369		1.36	m3
3	K2	K4	K6	0.369		163.897	m3
4	K1b	K2	K6	0.369		31.398	m3
5	K1a	K5	K6	0.398		6.531	m3
6	K1a	K1b	K6	0.398		6.596	m3
7	K1a	K4	K6	0.398		146.843	m3
8	K1b	K4	K5	0.632		5.382	m3
9	K1b	K3	K5	0.632		2.252	m3
10	K1a	K1b	K5	0.632		15.592	m3
11	K1b	K2	K5	0.632		8.92	m3
12	K1a	K1b	K4	1.761		26.311	m3
13	K1b	K2	K4	1.761		17.498	m3
14	K1a	K1b	K2	3.267		13.944	m3
15	K1b	K3	K4	stable		86.931	m3
16	K3	K4	K6	stable		30.076	m3
17	K3	K5	K6	stable		5.108	m3
18	K1b	K3	K6	stable		4.775	m3

Parete in avanzamento verso SE

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K3	K6	0.092		0.037	m3
2	K1b	K3	K5	0.092		0.039	m3
3	K1a	K1b	K3	0.092		0.034	m3
4	K1b	K2	K3	0.092		0.037	m3
5	K1b	K3	K4	0.092		0.036	m3
6	K2	K5	K6	0.347		3.04	m3
7	K1a	K3	K5	0.347		4.259	m3
8	K2	K4	K5	0.347		3.615	m3
9	K1a	K4	K5	0.347		17.526	m3
10	K1b	K5	K6	0.347		12.254	m3
11	K1a	K5	K6	0.347		16.295	m3
12	K1b	K4	K5	0.347		9.738	m3
13	K2	K3	K5	0.347		3.574	m3
14	K3	K4	K6	0.4		2.709	m3
15	K2	K3	K4	0.4		5.291	m3
16	K1a	K3	K4	0.4		2.375	m3
17	K3	K4	K5	0.4		11.299	m3
18	K4	K5	K6	0.558		6.584	m3
19	K1a	K1b	K5	0.632		15.31	m3
20	K1b	K2	K5	0.632		4.347	m3
21	K1a	K2	K5	0.865		4.167	m3
22	K3	K5	K6	3.736		41.811	m3
23	K1a	K3	K6	14.765		5.283	m3
24	K2	K3	K6	14.765		20.891	m3
25	K1a	K1b	K4	14.985		12.392	m3
26	K1a	K1b	K2	14.985		27.631	m3
27	K1a	K1b	K6	14.985		9.951	m3
28	K1a	K2	K6	stable		63.063	m3
29	K1b	K2	K4	stable		30.02	m3
30	K1b	K2	K6	stable		22.475	m3
31	K2	K4	K6	stable		10.287	m3
32	K1b	K4	K6	stable		8.485	m3
33	K1a	K4	K6	stable		8.328	m3
34	K1a	K2	K3	stable		6.489	m3
35	K1a	K2	K4	stable		5.484	m3

3.3 – GALLERIA NORD DIREZIONE N163

Tetto

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K4	K5	0		480.787	m3
2	K2	K4	K5	0		144.763	m3
3	K1b	K2	K5	0		143.347	m3
4	K1a	K1b	K3	0		131.749	m3
5	K1a	K1b	K4	0		130.308	m3
6	K1a	K1b	K6	0		124.653	m3
7	K1a	K1b	K2	0		90.466	m3
8	K1a	K3	K5	0		18.015	m3
9	K2	K3	K5	0		13.094	m3
10	K1a	K5	K6	0		12.481	m3
11	K2	K5	K6	0		9.697	m3

Parete W

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K2	K3	0.062		217.94	m3
2	K1b	K2	K6	0.369		276.098	m3
3	K2	K4	K6	0.369		219.899	m3
4	K1a	K4	K6	0.398		192.442	m3
5	K1a	K1b	K5	0.632		141.784	m3
6	K1a	K1b	K4	1.761		4.728	m3
7	K1b	K2	K4	1.761		142.731	m3
8	K1a	K1b	K2	3.267		0	m3
9	K1a	K3	K6	14.765		2.988	m3
10	K2	K3	K6	14.765		9.355	m3
11	K1b	K3	K4	stable		108.836	m3
12	K3	K4	K6	stable		19.745	m3
13	K1b	K3	K6	stable		6.025	m3
14	K3	K5	K6	stable		4.218	m3

Parete E

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K3	K6	0.136		2.988	m3
2	K1b	K3	K6	0.259		6.025	m3
3	K1b	K3	K4	0.259		98.408	m3
4	K2	K3	K6	0.324		9.355	m3
5	K3	K4	K6	0.427		19.745	m3
6	K3	K5	K6	3.736		4.09	m3
7	K1a	K1b	K2	14.985		0	m3

8	K1a	K1b	K4	14.985		4.728	m3
9	K1b	K2	K6	stable		276.098	m3
10	K2	K4	K6	stable		219.899	m3
11	K1b	K2	K3	stable		217.94	m3
12	K1a	K4	K6	stable		192.442	m3
13	K1a	K1b	K5	stable		141.784	m3
14	K1b	K2	K4	stable		129.791	m3

Parete in avanzamento verso S

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K2	K4	K5	0.347		7.521	m3
2	K1a	K4	K5	0.347		6.765	m3
3	K1b	K4	K5	0.347		5.059	m3
4	K4	K5	K6	0.347		7.951	m3
5	K3	K4	K5	0.347		4.195	m3
6	K1b	K2	K3	0.625		0.526	m3
7	K2	K3	K6	0.625		0.83	m3
8	K2	K3	K4	0.625		0.697	m3
9	K2	K3	K5	0.625		0.838	m3
10	K1a	K2	K3	0.625		0.233	m3
11	K1b	K5	K6	0.632		24.062	m3
12	K1b	K3	K5	0.632		3.836	m3
13	K1b	K2	K5	0.632		20.806	m3
14	K1a	K1b	K5	0.632		16.212	m3
15	K1a	K5	K6	0.865		28.941	m3
16	K1a	K3	K5	0.865		0.727	m3
17	K1a	K2	K5	0.865		14	m3
18	K2	K5	K6	1.44		33.805	m3
19	K1a	K1b	K4	14.985		19.129	m3
20	K1a	K1b	K2	14.985		17.234	m3
21	K1a	K1b	K6	14.985		15.676	m3
22	K1a	K1b	K3	14.985		0.56	m3
23	K3	K5	K6	stable		81.712	m3
24	K2	K4	K6	stable		59.166	m3
25	K1a	K4	K6	stable		53.409	m3
26	K1b	K2	K6	stable		33.505	m3
27	K1a	K2	K6	stable		27.816	m3
28	K3	K4	K6	stable		17.959	m3
29	K1b	K4	K6	stable		16.696	m3
30	K1b	K2	K4	stable		12.918	m3
31	K1b	K3	K6	stable		5.752	m3
32	K1b	K3	K4	stable		4.093	m3
33	K1a	K2	K4	stable		1.823	m3
34	K1a	K3	K6	stable		0.811	m3

35	K1a	K3	K4	stable		0.741	m3
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Parete in avanzamento verso N

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K2	K3	0.062		0.233	m3
2	K1a	K3	K6	0.062		0.811	m3
3	K1a	K1b	K3	0.062		0.56	m3
4	K1a	K3	K5	0.062		0.727	m3
5	K1a	K3	K4	0.062		0.741	m3
6	K1b	K3	K4	0.259		4.093	m3
7	K1b	K3	K6	0.259		5.752	m3
8	K1b	K3	K5	0.259		3.836	m3
9	K1b	K2	K3	0.259		0.526	m3
10	K2	K4	K6	0.369		59.166	m3
11	K1b	K2	K6	0.369		33.505	m3
12	K1a	K2	K6	0.369		27.816	m3
13	K2	K3	K6	0.369		0.83	m3
14	K2	K5	K6	0.369		33.805	m3
15	K1a	K5	K6	0.398		28.941	m3
16	K1a	K4	K6	0.398		53.409	m3
17	K1a	K1b	K6	0.398		15.676	m3
18	K3	K4	K5	0.427		4.195	m3
19	K3	K4	K6	0.427		17.959	m3
20	K2	K3	K4	0.427		0.697	m3
21	K4	K5	K6	0.609		7.951	m3
22	K1b	K5	K6	0.66		24.062	m3
23	K1b	K4	K6	0.66		16.696	m3
24	K2	K4	K5	1.415		7.521	m3
25	K1b	K4	K5	1.761		5.059	m3
26	K1a	K1b	K4	1.761		19.129	m3
27	K1b	K2	K4	1.761		12.918	m3
28	K1a	K4	K5	2.079		6.765	m3
29	K1a	K2	K5	3.267		14	m3
30	K1a	K1b	K2	3.267		17.234	m3
31	K1a	K2	K4	3.267		1.823	m3
32	K3	K5	K6	3.736		81.712	m3
33	K2	K3	K5	3.736		0.838	m3
34	K1b	K2	K5	3.789		20.806	m3
35	K1a	K1b	K5	stable		16.212	m3

3.4 – GALLERIA NORD DIREZIONE N253

Tetto

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K2	K3	KK5	0.062		8.208	m3
2	K1a	K3	KK5	0.062		10.226	m3
3	K2	K3	K4	0.062		79.682	m3
4	K1a	K3	K5	0.062		0.727	m3
5	K1a	K3	K4	0.062		56.884	m3
6	K4	K5	KK5	0.347		7.951	m3
7	K3	K4	K5	0.4		218.583	m3
8	K1b	K2	K3	0.625		0.526	m3
9	K1b	K5	KK5	0.632		24.062	m3
10	K1b	K4	K5	1.761		5.059	m3
11	K1a	K2	K4	3.267		1.462	m3
12	K1a	K2	K5	3.267		14	m3
13	K1a	K2	K3	stable		42.977	m3
14	K1a	K2	KK5	stable		34.904	m3
15	K1b	K4	KK5	stable		18.612	m3

Parete N

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K1b	K3	0.062		0.56	m3
2	K1a	K2	K3	0.062		0.233	m3
3	K1b	K2	K3	0.062		17.916	m3
4	K2	K4	K5	0.347		7.521	m3
5	K3	K4	K5	0.347		4.195	m3
6	K1a	K4	K5	0.347		6.765	m3
7	K2	K4	KK5	0.369		83.11	m3
8	K2	K5	KK5	0.369		33.805	m3
9	K1b	K2	KK5	0.369		106.697	m3
10	K1a	K1b	KK5	0.398		15.676	m3
11	K1a	K5	KK5	0.398		28.941	m3
12	K1a	K4	KK5	0.398		64.65	m3
13	K1a	K1b	K5	0.632		25.043	m3
14	K1b	K2	K5	0.632		20.806	m3
15	K1b	K3	K5	0.632		3.836	m3
16	K1b	K2	K4	1.761		24.308	m3
17	K1a	K1b	K4	1.761		19.129	m3
18	K1a	K1b	K2	3.267		17.234	m3
19	K3	K5	KK5	stable		138.407	m3
20	K1b	K3	K4	stable		103.757	m3
21	K3	K4	KK5	stable		38.437	m3
22	K1b	K3	KK5	stable		18.42	m3

Parete S

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K3	K4	0.259		100.466	m3
2	K1b	K3	K5	0.259		3.836	m3
3	K1b	K3	KK5	0.259		18.42	m3
4	K3	K4	KK5	0.427		38.437	m3
5	K3	K4	K5	0.427		4.195	m3
6	K1a	K2	K3	0.625		0.233	m3
7	K1a	K5	KK5	0.865		28.941	m3
8	K2	K4	K5	1.415		7.521	m3
9	K2	K5	KK5	1.44		33.805	m3
10	K1a	K4	K5	2.079		6.765	m3
11	K3	K5	KK5	3.736		138.572	m3
12	K1b	K2	K5	3.789		20.806	m3
13	K1a	K1b	K3	14.985		0.56	m3
14	K1a	K1b	KK5	14.985		15.676	m3
15	K1a	K1b	K4	14.985		19.129	m3
16	K1a	K1b	K2	14.985		17.234	m3
17	K2	K4	KK5	stable		122.054	m3
18	K1b	K2	KK5	stable		107.246	m3
19	K1a	K4	KK5	stable		84.614	m3
20	K1a	K1b	K5	stable		25.043	m3
21	K1b	K2	K3	stable		17.916	m3
22	K1b	K2	K4	stable		11.426	m3

Parete in avanzamento verso W

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1a	K1b	KK5	0.127		3.299	m3
2	K1a	K1b	K3	0.127		4.17	m3
3	K1a	K5	KK5	0.127		4.374	m3
4	K1a	K4	KK5	0.127		1.727	m3
5	K1a	K3	K5	0.127		7.65	m3
6	K1a	K3	K4	0.127		2.829	m3
7	K1a	K2	K3	0.127		0	m3
8	K1a	K2	KK5	0.127		0	m3
9	K1a	K3	KK5	0.136		2.988	m3
10	K2	K4	KK5	0.324		3.847	m3
11	K1b	K2	KK5	0.324		6.465	m3
12	K2	K3	KK5	0.324		9.355	m3
13	K2	K5	KK5	0.324		13.165	m3
14	K1b	K2	K3	0.625		6.137	m3
15	K2	K3	K4	0.625		5.873	m3
16	K2	K3	K5	0.625		21.311	m3

17	K1a	K2	K5	0.865		0	m3
18	K1a	K1b	K5	0.865		0.227	m3
19	K1a	K4	K5	0.865		2.662	m3
20	K1b	K2	K5	1.44		0.239	m3
21	K2	K4	K5	1.44		5.293	m3
22	K1a	K1b	K2	14.985		0	m3
23	K1a	K1b	K4	14.985		3.111	m3
24	K1b	K4	KK5	stable		44.838	m3
25	K3	K4	K5	stable		39.474	m3
26	K4	K5	KK5	stable		33.066	m3
27	K3	K4	KK5	stable		17.078	m3
28	K1b	K3	K4	stable		13.019	m3
29	K1b	K2	K4	stable		7.625	m3
30	K1b	K3	KK5	stable		5.122	m3
31	K3	K5	KK5	stable		4.094	m3
32	K1b	K4	K5	stable		0.256	m3
33	K1b	K5	KK5	stable		0.238	m3
34	K1b	K3	K5	stable		0.225	m3
35	K1a	K2	K4	stable		0	m3

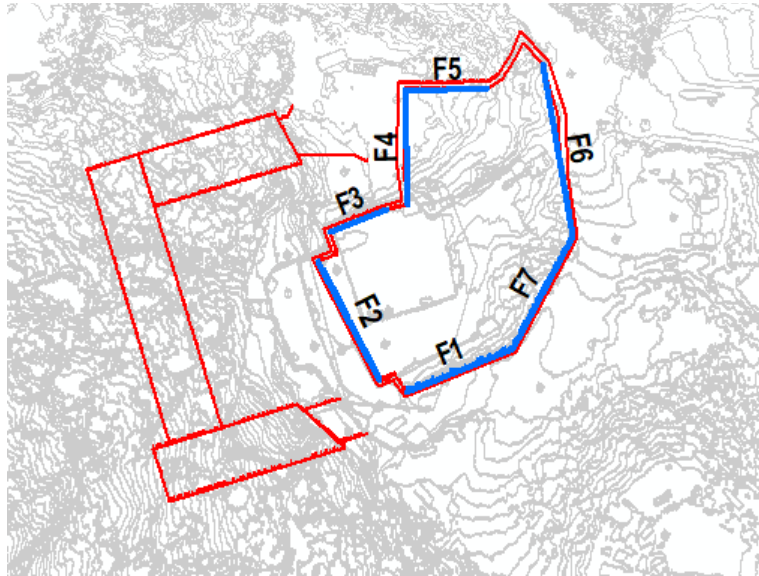
Parete in avanzamento verso E

Combination	Joint_A	Joint_B	Joint_C	Factor_of_Safety	Units	Wedge_Volume	Units
1	K1b	K3	K5	0.092		0.225	m3
2	K1b	K2	K5	0.092		0.239	m3
3	K1a	K1b	K5	0.092		0.227	m3
4	K1b	K5	KK5	0.092		0.238	m3
5	K1b	K4	K5	0.092		0.256	m3
6	K1b	K3	KK5	0.259		5.122	m3
7	K1b	K2	K3	0.259		6.137	m3
8	K1b	K3	K4	0.259		13.019	m3
9	K1a	K1b	K3	0.259		4.17	m3
10	K1a	K4	K5	0.4		2.662	m3
11	K3	K4	K5	0.4		39.474	m3
12	K4	K5	KK5	0.4		33.066	m3
13	K2	K4	K5	0.4		5.293	m3
14	K3	K4	KK5	0.427		17.078	m3
15	K1a	K3	K4	0.427		2.829	m3
16	K2	K3	K4	0.427		5.873	m3
17	K2	K4	KK5	0.609		3.847	m3
18	K1a	K4	KK5	0.609		1.727	m3
19	K1b	K4	KK5	0.66		44.838	m3
20	K1a	K1b	KK5	0.66		3.299	m3
21	K1b	K2	KK5	0.66		6.465	m3
22	K1a	K1b	K4	1.761		3.111	m3

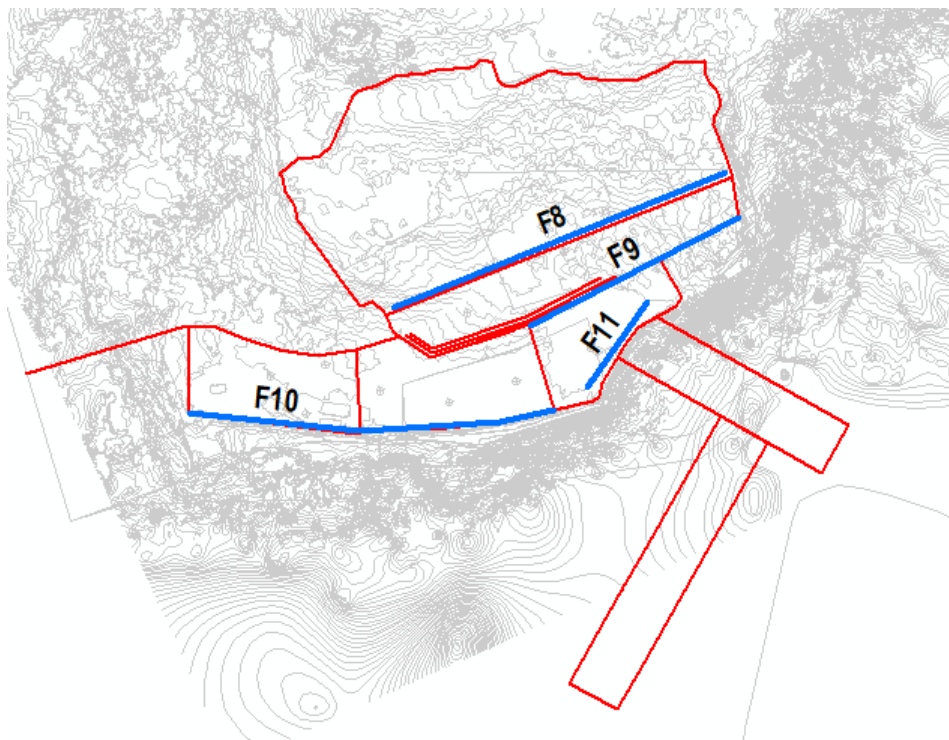
23	K1b	K2	K4	1.761		7.625	m3
24	K1a	K2	K4	3.267		0	m3
25	K1a	K2	K5	3.267		0	m3
26	K1a	K2	KK5	3.267		0	m3
27	K1a	K2	K3	3.267		0	m3
28	K1a	K1b	K2	3.267		0	m3
29	K1a	K5	KK5	3.33		4.374	m3
30	K2	K5	KK5	3.33		13.165	m3
31	K3	K5	KK5	3.736		4.094	m3
32	K1a	K3	K5	3.736		7.65	m3
33	K2	K3	K5	3.736		21.311	m3
34	K2	K3	KK5	14.765		9.355	m3
35	K1a	K3	KK5	14.765		2.988	m3

4 -VALUTAZIONI PREVISIONALI COLTIVAZIONE A CIELO APERTO

Allo scopo di svolgere valutazioni preliminari a riguardo delle condizioni di stabilità dei fronti di coltivazione sono stati individuati i cinematismi potenzialmente rimuovibili generati dall'intersezione tra i principali set di fratture individuati e le geometrie ricorrenti dei principali fronti di avanzamento previsti dal piano. In particolare, l'ubicazione, identificazione e geometria dei fronti di coltivazione sono riportate nella seguente figura e nella seguente tabella:



UBICAZIONE DEI FRONTI DI COLTIVAZIONE CANTIERE INFERIORE



UBICAZIONE DEI FRONTI DI COLTIVAZIONE CANTIERE SUPERIORE

sigla	direct	dip	altezza
F1	68	88	22
F2	153	88	20
F3	68	88	27
F4	1	88	25
F5	88	88	25
F6	170	88	18
F7	30	88	20
F8	65	88	6
F9	60	88	18
F10	90	88	30
F11	40	88	30

ORIENTAZIONE ED ALTEZZA (m) DEI FRONTI DI COLTIVAZIONE

Tramite il software Dips 8.0 della Rocscience è stata quindi effettuata in proiezione stereografica un'analisi di stabilità qualitativa per le seguenti tipologie di cinematismi:

Scorrimento planare.

Le condizioni cinematiche per lo scorrimento planare sono:

- il piano di scorrimento immerge come il versante con direzione di immersione preferibilmente compresa tra $+20^\circ$ e -20° dalla direzione di immersione del versante;
- il piano di scorrimento deve essere a franapoggio meno inclinato del pendio;
- l'inclinazione del piano di scorrimento è maggiore dell'angolo di attrito.

Scorrimento di cunei.

Le condizioni cinematiche per lo scorrimento di cunei sono:

- la linea di intersezione immerge nello stesso senso del versante;
- l'inclinazione apparente del versante nella direzione di immersione della linea di intersezione è maggiore dell'inclinazione della linea di intersezione, che deve affiorare sul versante;
- l'inclinazione del piano di scorrimento è maggiore dell'angolo di attrito medio sui due piani.

Ribaltamento diretto.

Per avere questo tipo di cinematismo si devono considerare contemporaneamente due condizioni:

Orientazione del piano basale.

- il piano basale deve essere a franapoggio meno inclinato del pendio;
- l'inclinazione del piano basale deve essere minore dell'angolo di attrito;
- il piano basale immerge come il versante con direzione di immersione preferibilmente compresa tra $+20^\circ$ e -20° dalla direzione di immersione del versante;
- l'inclinazione del piano basale può arrivare fino al valore dell'inclinazione del versante (estensione per scivolamento + ribaltamento).

Orientazione della linea di intersezione.

- la linea di intersezione deve essere a reggipoggio;
- la linea di intersezione immerge come il versante con direzione di immersione preferibilmente compresa tra $+20^\circ$ e -20° dalla direzione di immersione del versante;
- l'inclinazione della linea di intersezione deve essere maggiore di $(90^\circ - \text{angolo di attrito})$;
- l'inclinazione della linea di intersezione può arrivare fino all'orizzontale (estensione per i blocchi incastrati);
- la linea di intersezione immerge come il versante con direzione di immersione preferibilmente compresa tra $+90^\circ$ e -90° dalla direzione di immersione del versante (estensione per pendii molto acclivi);

Ovviamente per avere ribaltamento diretto devono rientrare in zona critica sia le intersezioni che i poli dei piani basali.

Ribaltamento di flessura.

Il ribaltamento di flessura si differenzia dal ribaltamento diretto per l'assenza di un piano basale di ribaltamento e per la non perfetta individuazione di blocchi nell'ammasso roccioso. Condizione

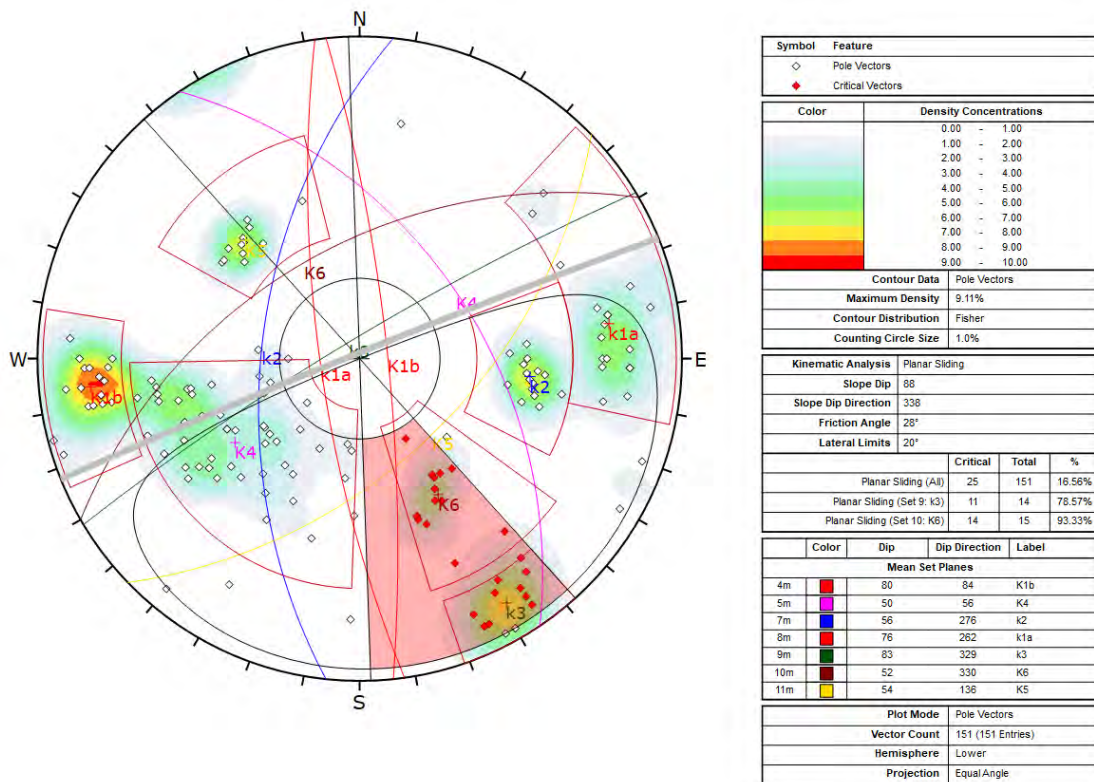
indispensabile per la rottura di blocchi colonnari o lastriformi è la presenza di movimenti di scorrimento relativo lungo i giunti.

Le condizioni cinematiche per il ribaltamento di flessura sono:

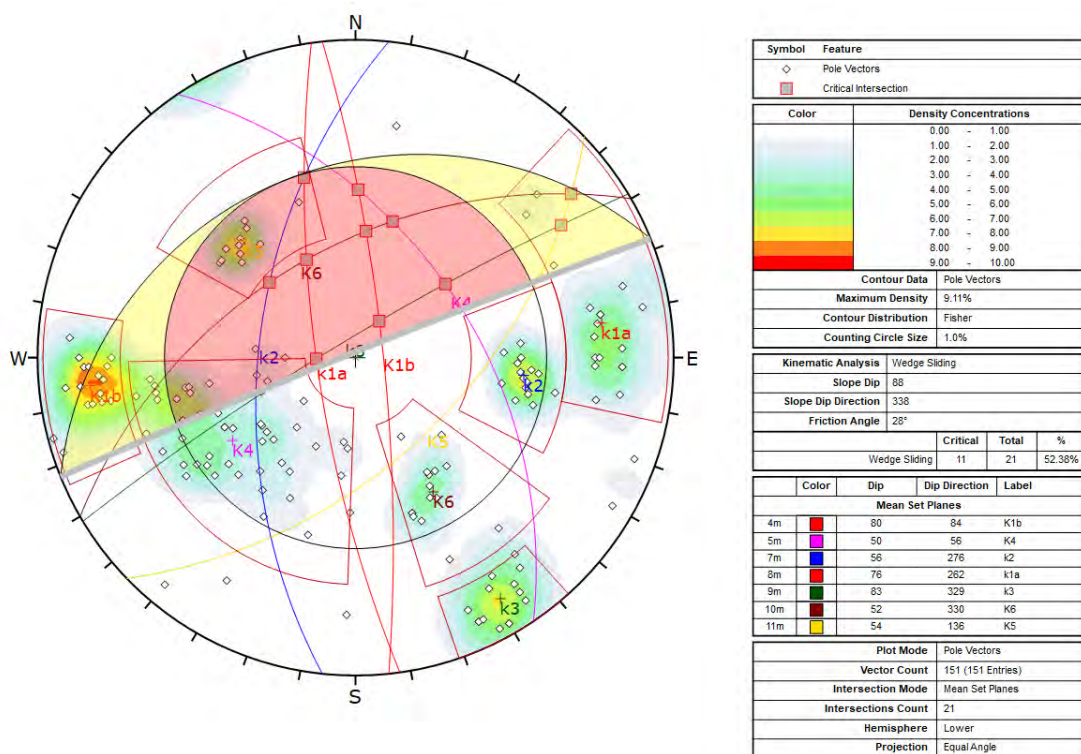
- il piano di scorrimento relativo deve essere a reggipoggio;
- il piano di scorrimento relativo immerge come il versante con direzione di immersione preferibilmente compresa tra $+20^\circ$ e -20° dalla direzione di immersione del versante;
- la condizione di scivolamento di inter-strato deve essere soddisfatta.

Nell'ambito delle analisi svolte sono stati assunti per tutti i set di frattura valori di angolo di attrito pari a 28° e di coesione nulli.

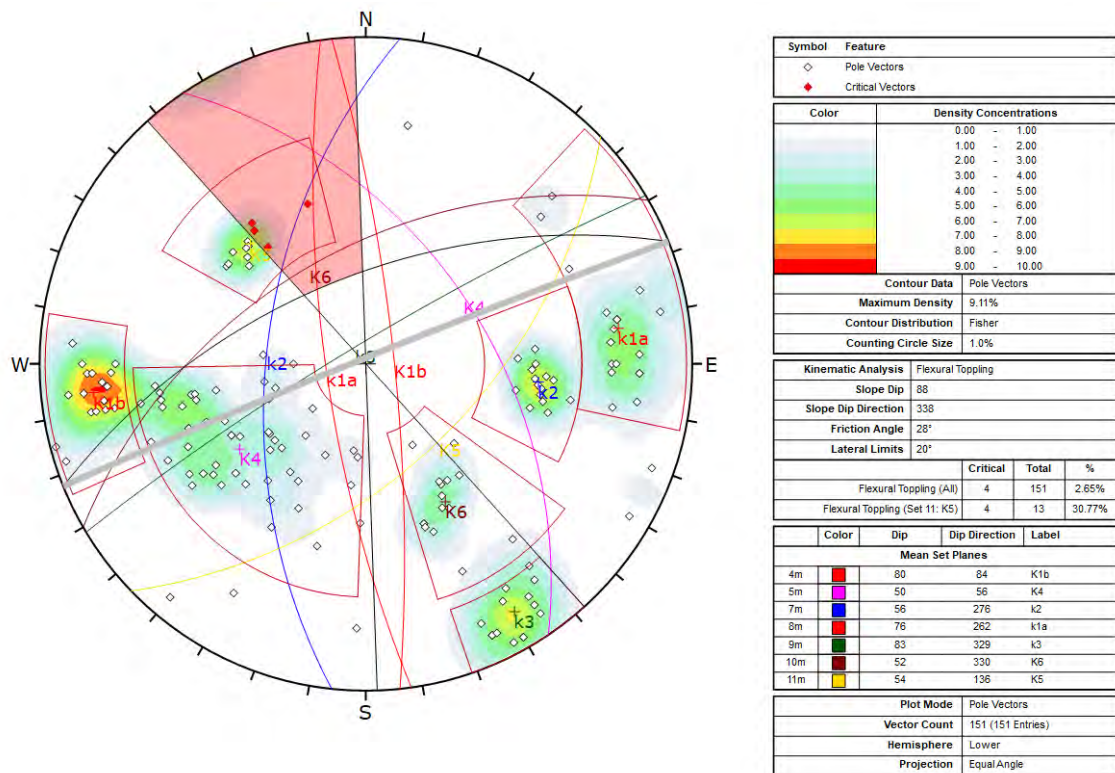
Di seguito si riporta il layout delle verifiche eseguite.



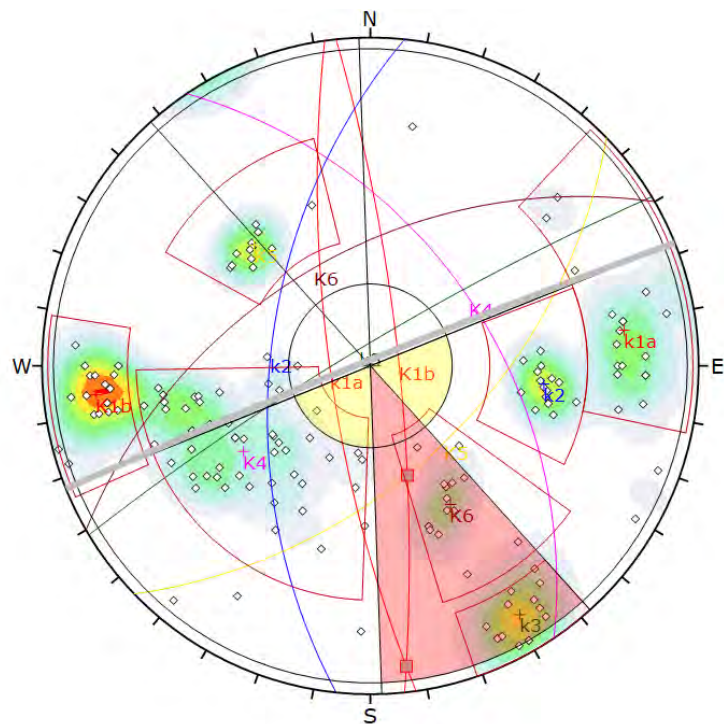
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA
LUNGO IL FRONTE F1



VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA
DUE FRATTURE LUNGO IL FRONTE F1



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F1



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

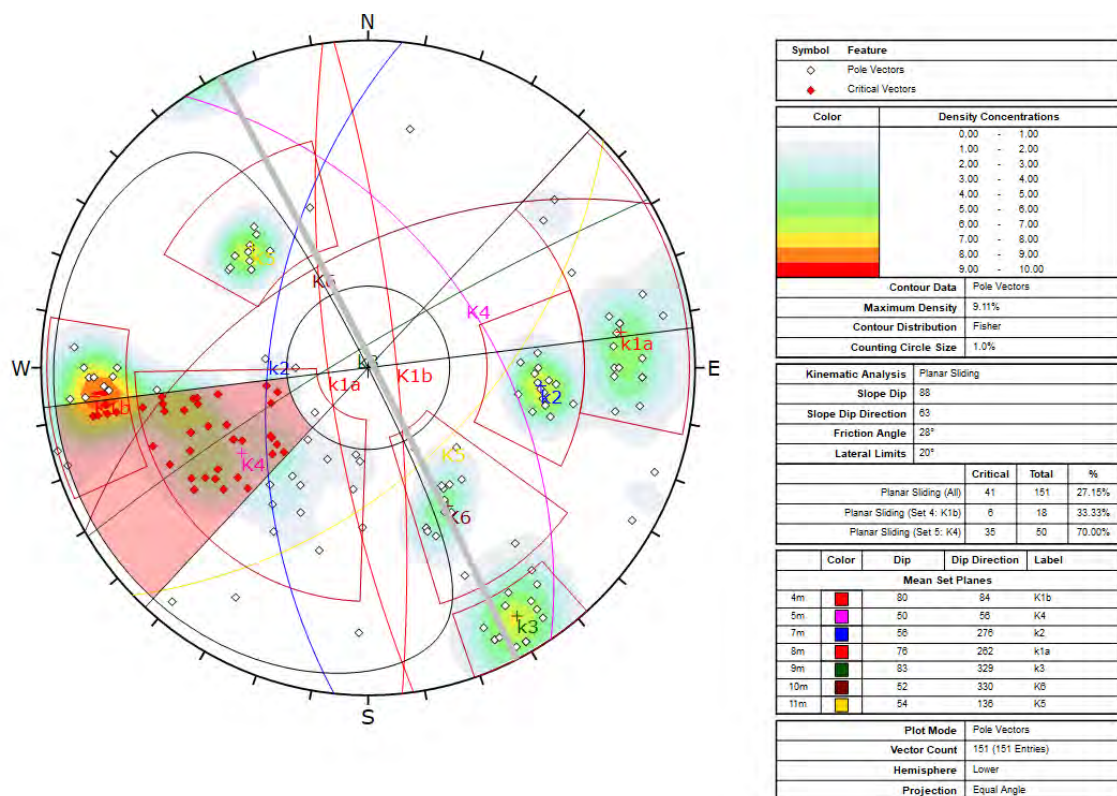
Kinematic Analysis	Direct Toppling
Slope Dip	88
Slope Dip Direction	338
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	2	21	9.52%
Oblique Toppling (Intersection)	0	21	0.00%
Base Plane (All)	29	151	19.21%
Base Plane (Set 5: K4)	1	50	2.00%
Base Plane (Set 9: k3)	14	14	100.00%
Base Plane (Set 10: k5)	14	15	93.33%

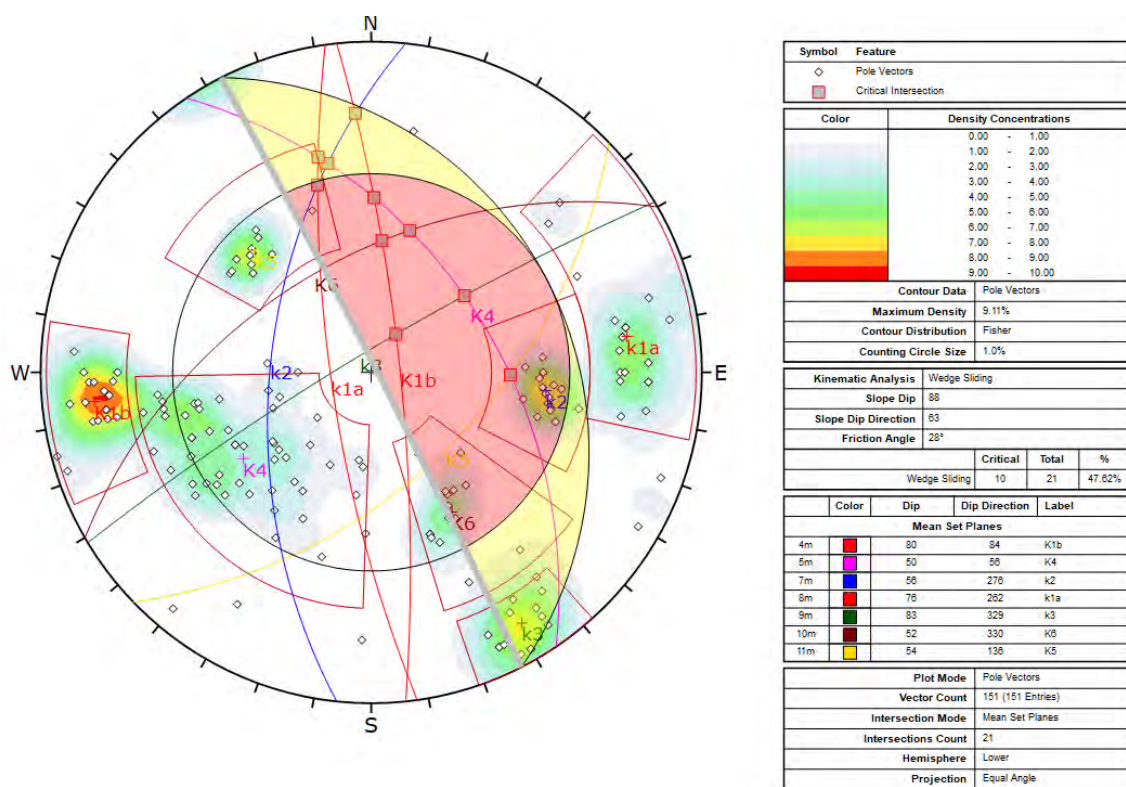
	Color	Dip	Dip Direction	Label
Mean Set Planes				
4m	■	80	84	K1b
5m	■	50	56	K4
7m	■	56	278	k2
8m	■	76	262	k1a
9m	■	83	329	k3
10m	■	52	330	k5
11m	■	54	136	k5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersections Count	21
Hemisphere	Lower
Projection	Equal Angle

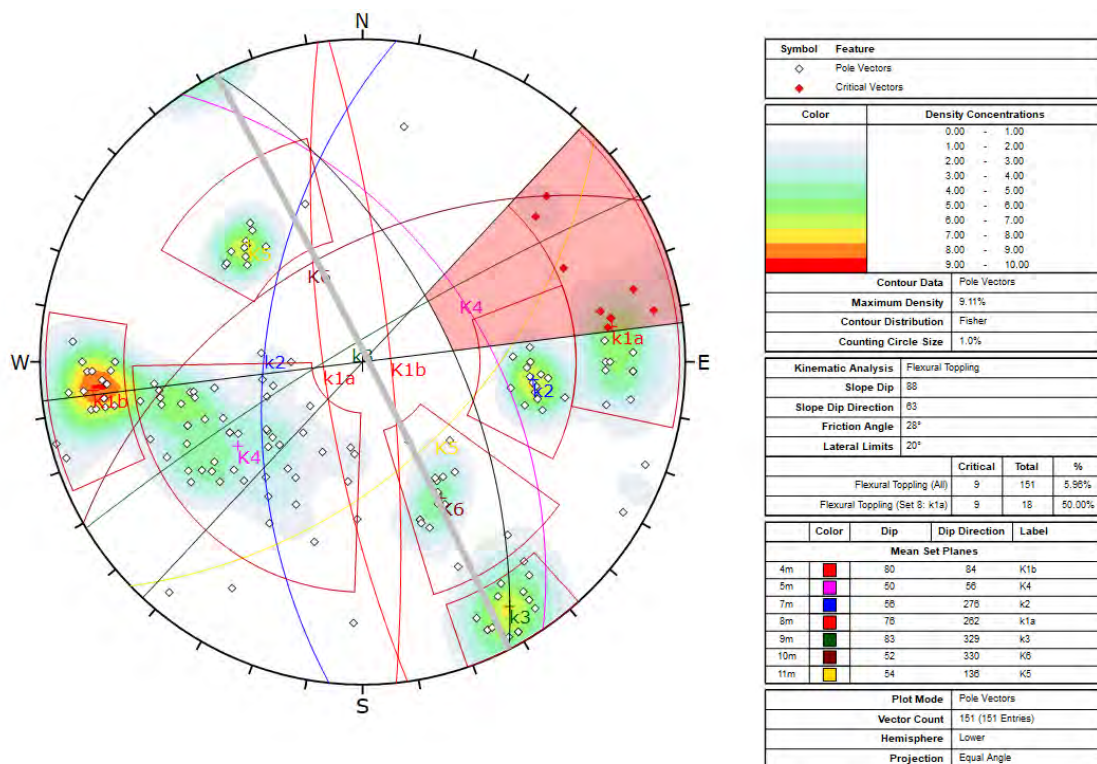
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F1



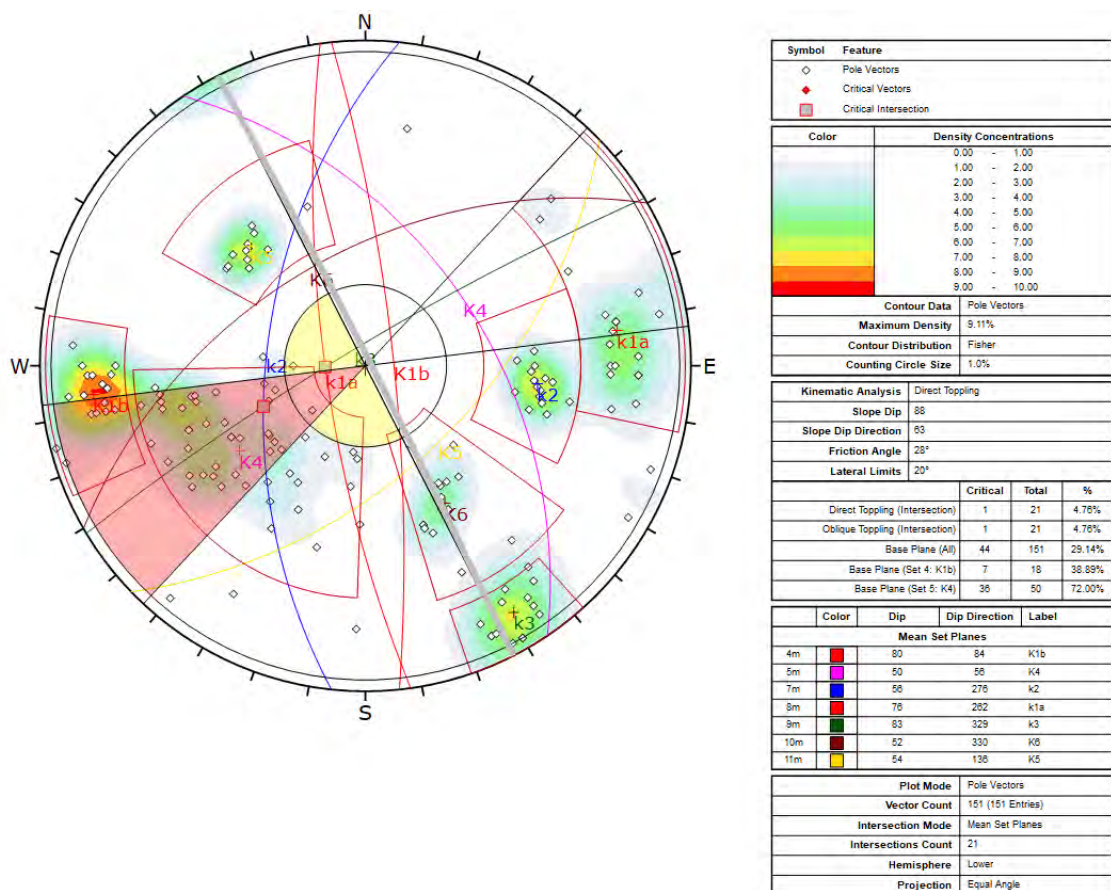
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F2



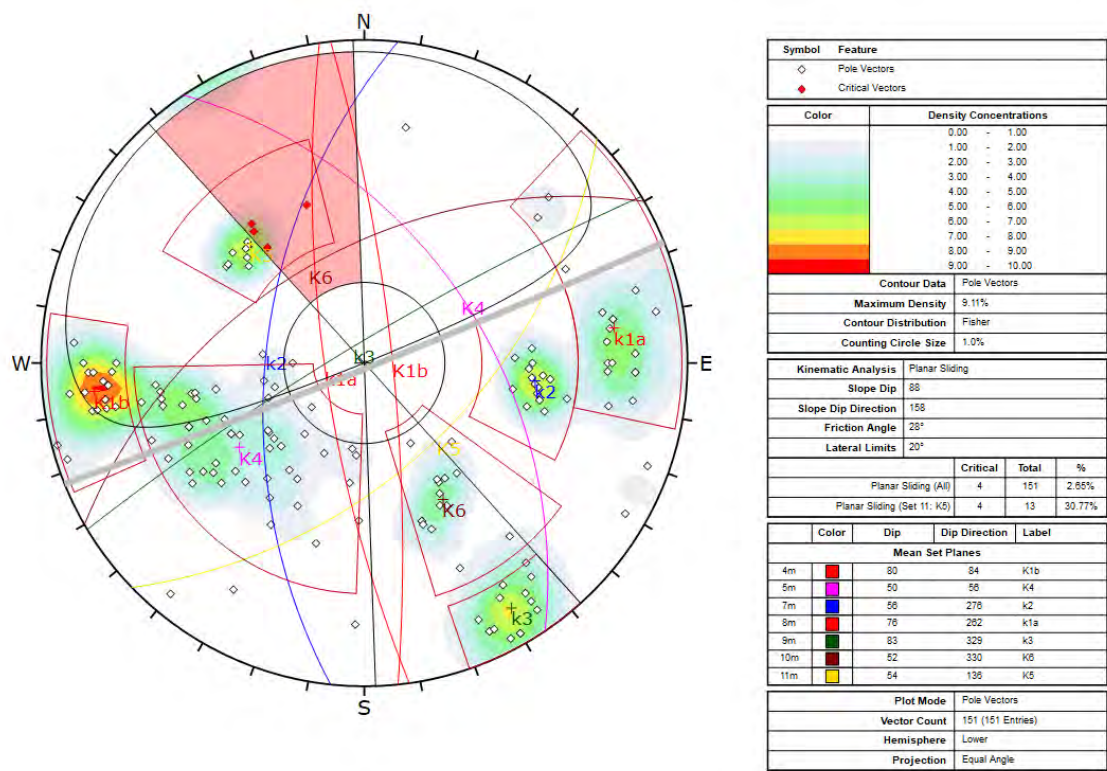
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F2



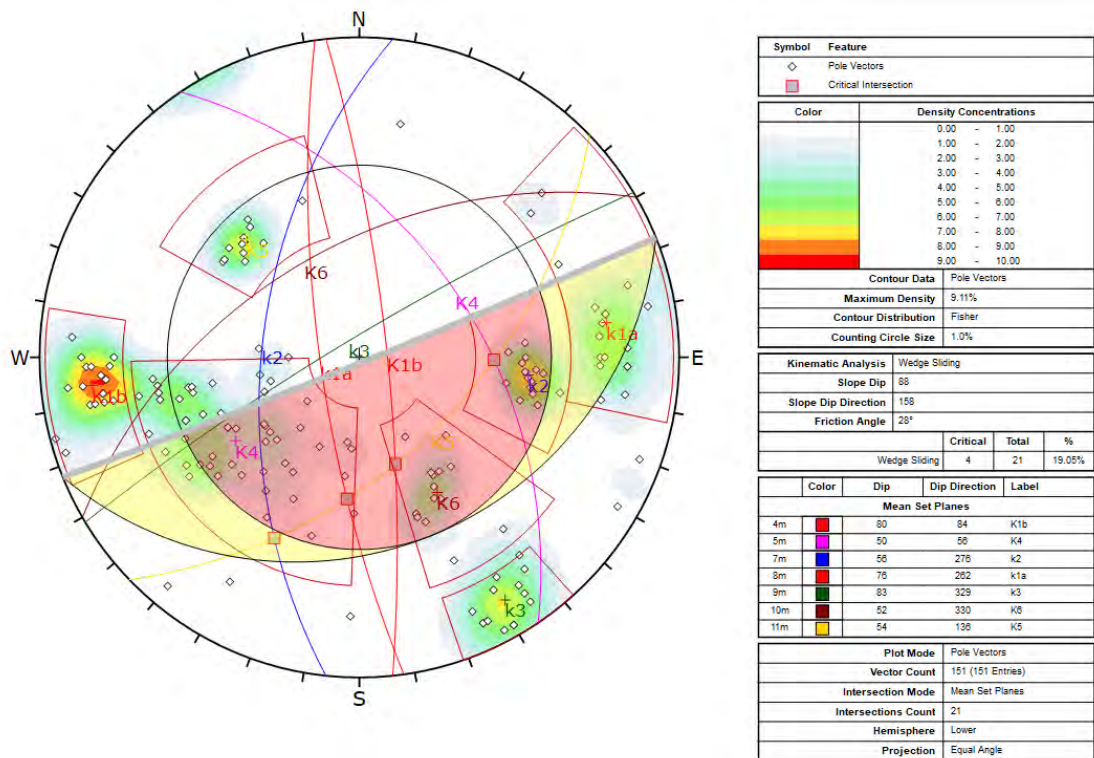
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F2



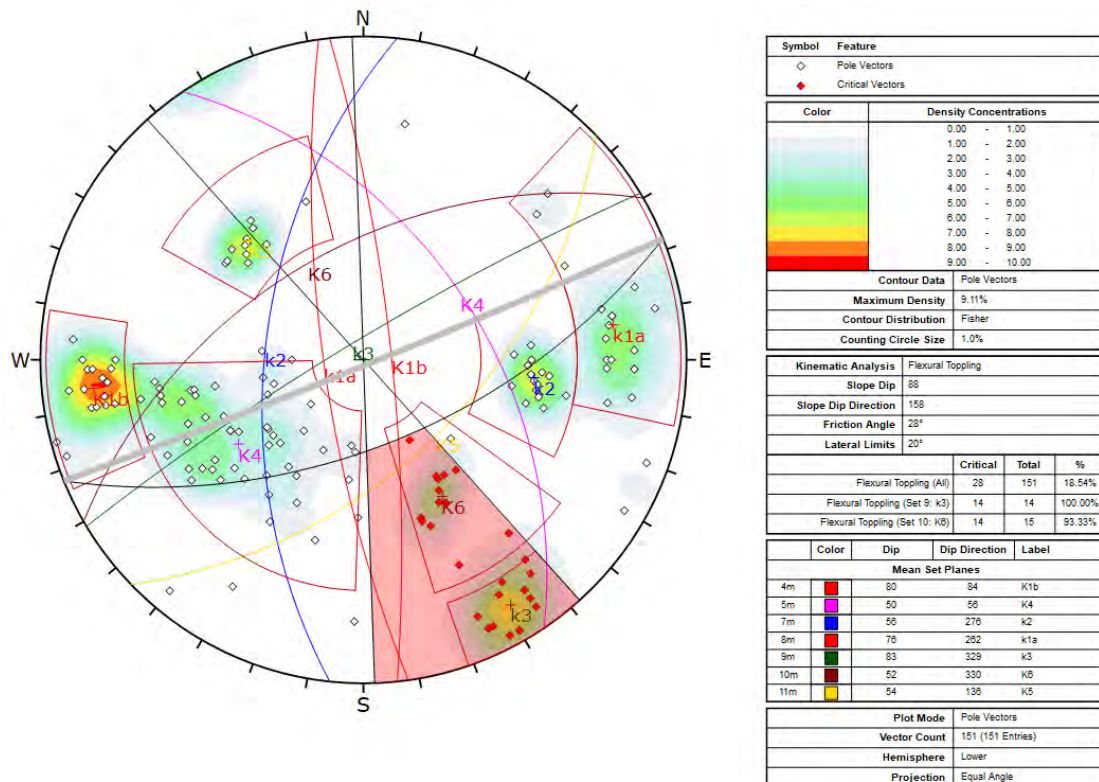
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F2



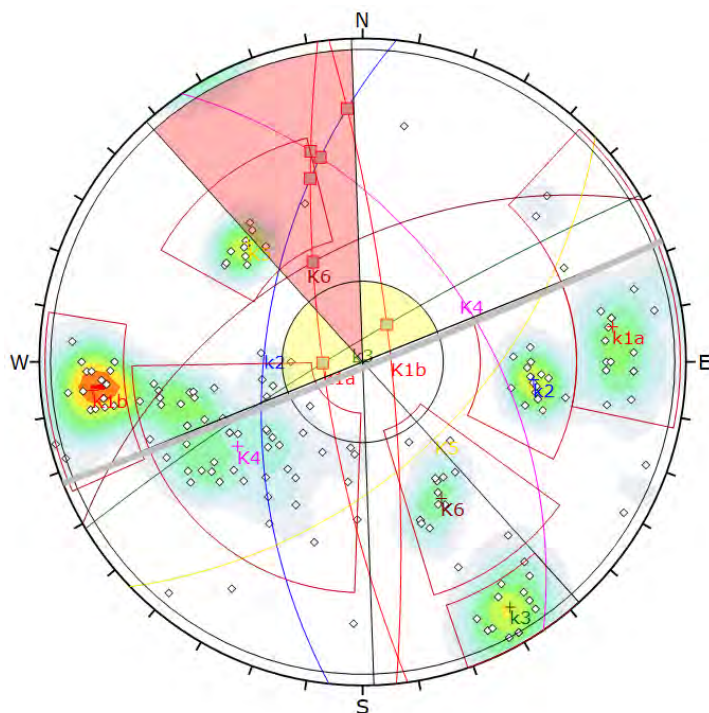
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F3



VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F3



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F3



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

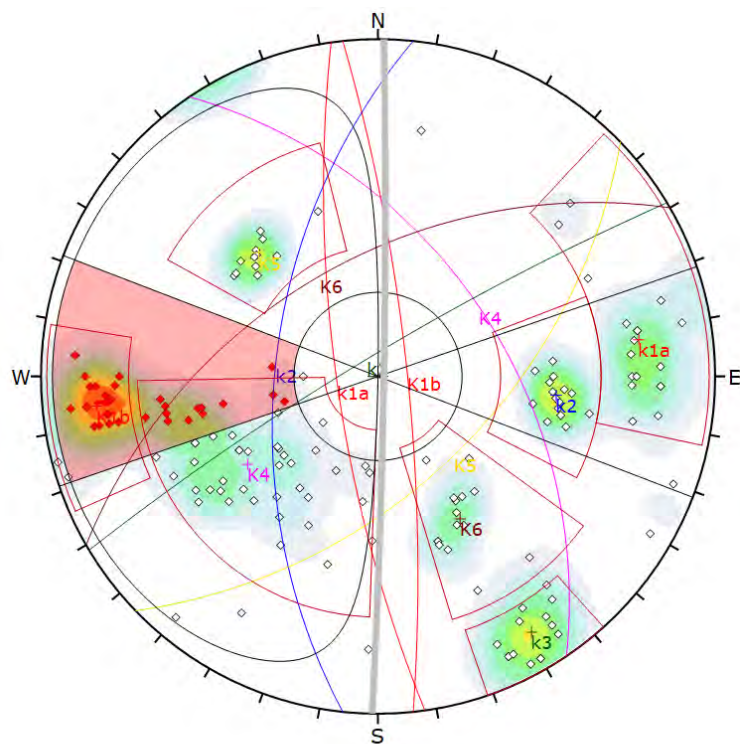
Kinematic Analysis	Direct Toppling
Slope Dip	88
Slope Dip Direction	158
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	5	21	23.81%
Oblique Toppling (Intersection)	2	21	9.52%
Base Plane (All)	5	151	3.31%
Base Plane (Set 11: K5)	4	13	30.77%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	262	k1a
9m	63	329	k3
10m	52	330	K6
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersections Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F3



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors

Color	Density Concentrations
0.00 - 1.00	
1.00 - 2.00	
2.00 - 3.00	
3.00 - 4.00	
4.00 - 5.00	
5.00 - 6.00	
6.00 - 7.00	
7.00 - 8.00	
8.00 - 9.00	
9.00 - 10.00	

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

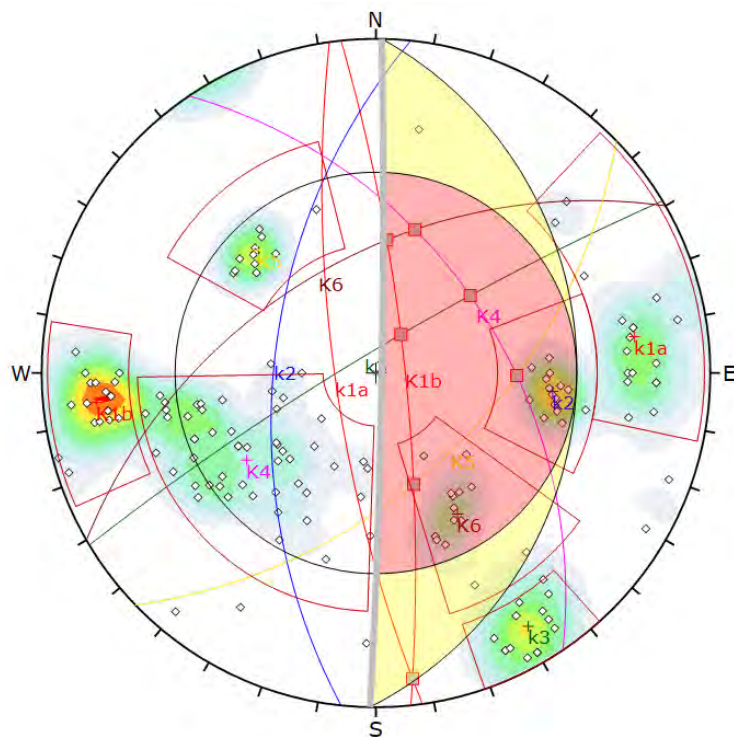
Kinematic Analysis	Planar Sliding
Slope Dip	88
Slope Dip Direction	91
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	29	151	19.21%
Planar Sliding (Set 4: K1b)	16	18	88.89%
Planar Sliding (Set 5: K4)	12	50	24.00%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	K2
8m	76	262	K1a
9m	83	329	K3
10m	52	330	K6
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F4



Symbol	Feature
◇	Pole Vectors
■	Critical Intersection

Color	Density Concentrations
0.00 - 1.00	
1.00 - 2.00	
2.00 - 3.00	
3.00 - 4.00	
4.00 - 5.00	
5.00 - 6.00	
6.00 - 7.00	
7.00 - 8.00	
8.00 - 9.00	
9.00 - 10.00	

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

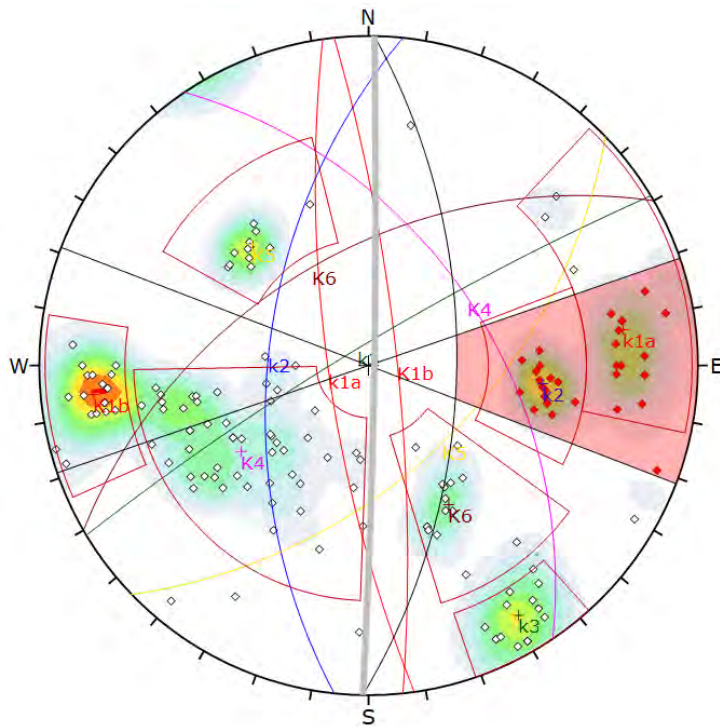
Kinematic Analysis	Wedge Sliding
Slope Dip	88
Slope Dip Direction	91
Friction Angle	28°

	Critical	Total	%
Wedge Sliding	7	21	33.33%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	K2
8m	76	262	K1a
9m	83	329	K3
10m	52	330	K6
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersections Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F4



Symbol	Feature
○	Pole Vectors
◆	Critical Vectors

Color	Density Concentrations
0.00	- 1.00
1.00	- 2.00
2.00	- 3.00
3.00	- 4.00
4.00	- 5.00
5.00	- 6.00
6.00	- 7.00
7.00	- 8.00
8.00	- 9.00
9.00	- 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

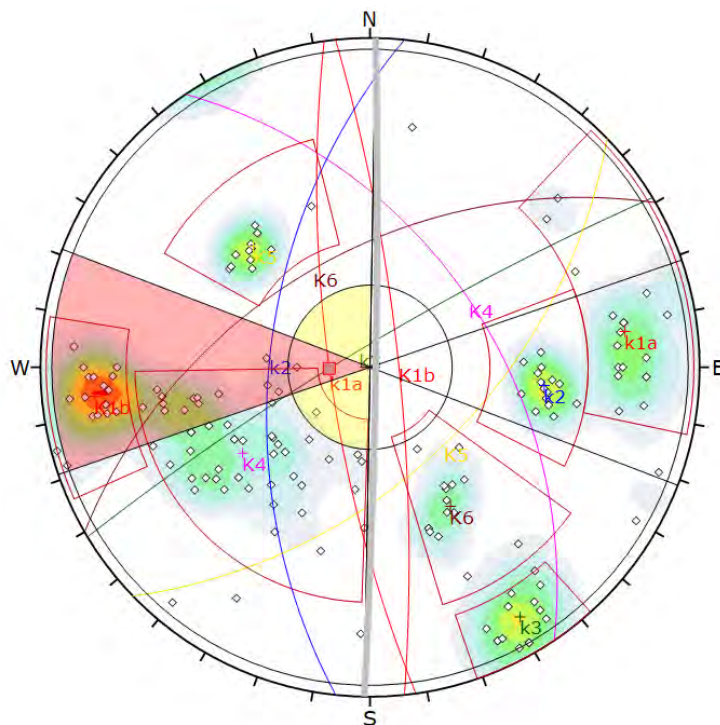
Kinematic Analysis	Flexural Toppling
Slope Dip	88
Slope Dip Direction	91
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Flexural Toppling (All)	31	151	20.53%
Flexural Toppling (Set 7: k2)	15	15	100.00%
Flexural Toppling (Set 8: k1a)	15	18	83.33%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	58	278	k2
8m	78	282	k1a
9m	83	329	k3
10m	52	330	k6
11m	54	138	k5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F4



Symbol	Feature
○	Pole Vectors
◆	Critical Vectors
■	Critical Intersection

Color	Density Concentrations
0.00	- 1.00
1.00	- 2.00
2.00	- 3.00
3.00	- 4.00
4.00	- 5.00
5.00	- 6.00
6.00	- 7.00
7.00	- 8.00
8.00	- 9.00
9.00	- 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

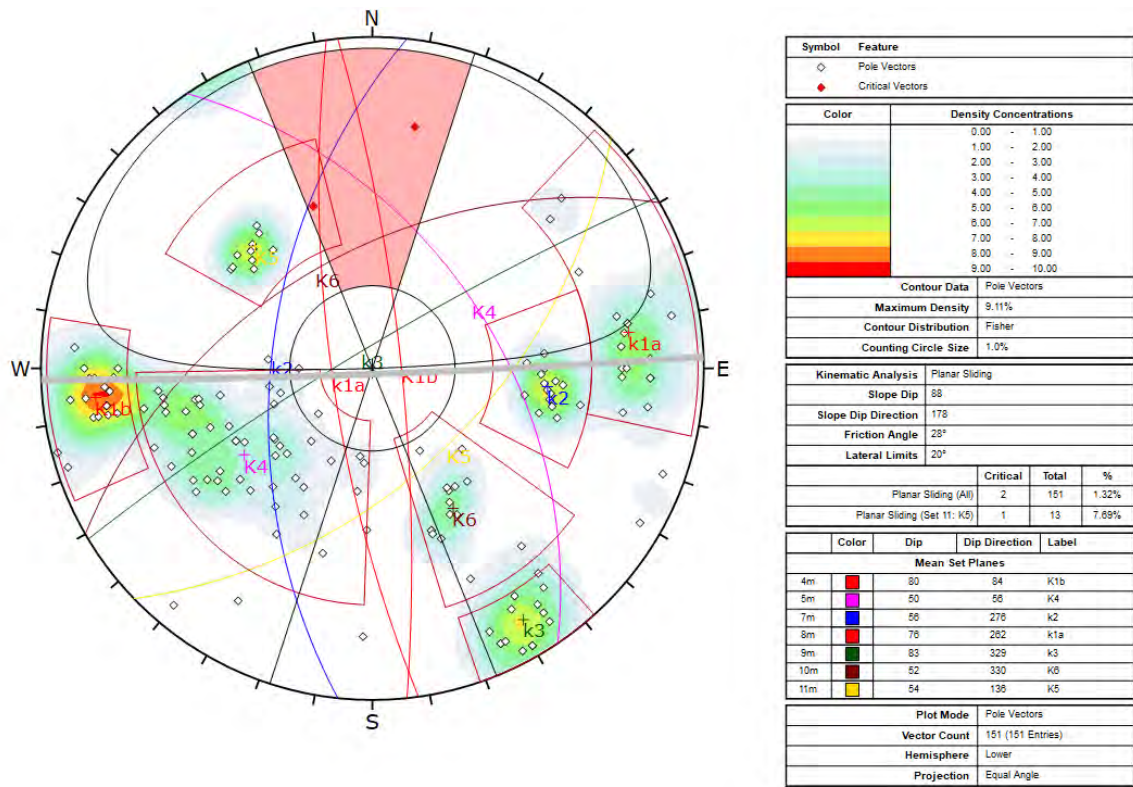
Kinematic Analysis	Direct Toppling
Slope Dip	88
Slope Dip Direction	91
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	1	21	4.76%
Oblique Toppling (Intersection)	0	21	0.00%
Base Plane (All)	32	151	21.19%
Base Plane (Set 4: K1b)	17	18	94.44%
Base Plane (Set 5: K4)	13	50	28.00%

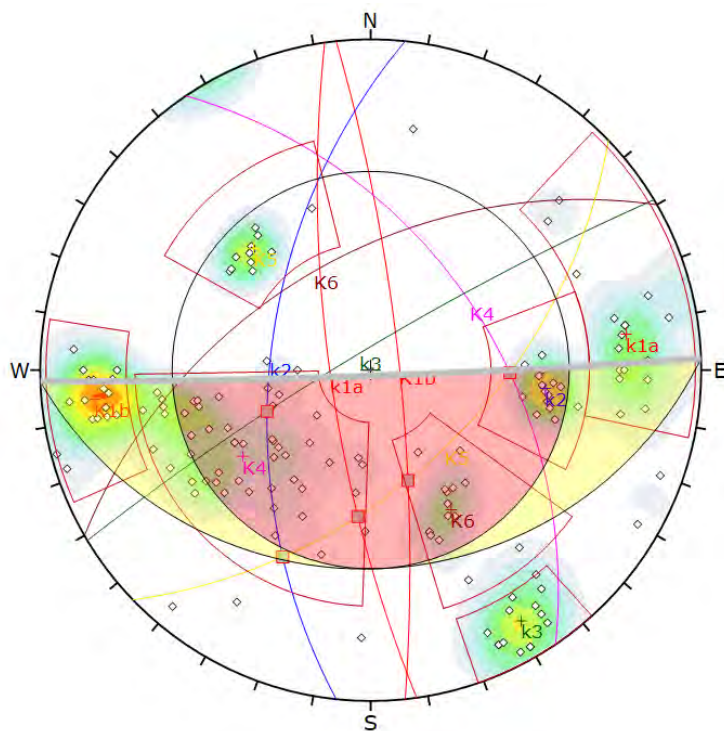
Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	58	278	k2
8m	78	282	k1a
9m	83	329	k3
10m	52	330	k6
11m	54	138	k5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersection Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F4



VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F5



Symbol	Feature
◇	Pole Vectors
■	Critical Intersection

Color	Density Concentrations
0.00	~ 1.00
1.00	~ 2.00
2.00	~ 3.00
3.00	~ 4.00
4.00	~ 5.00
5.00	~ 6.00
6.00	~ 7.00
7.00	~ 8.00
8.00	~ 9.00
9.00	~ 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

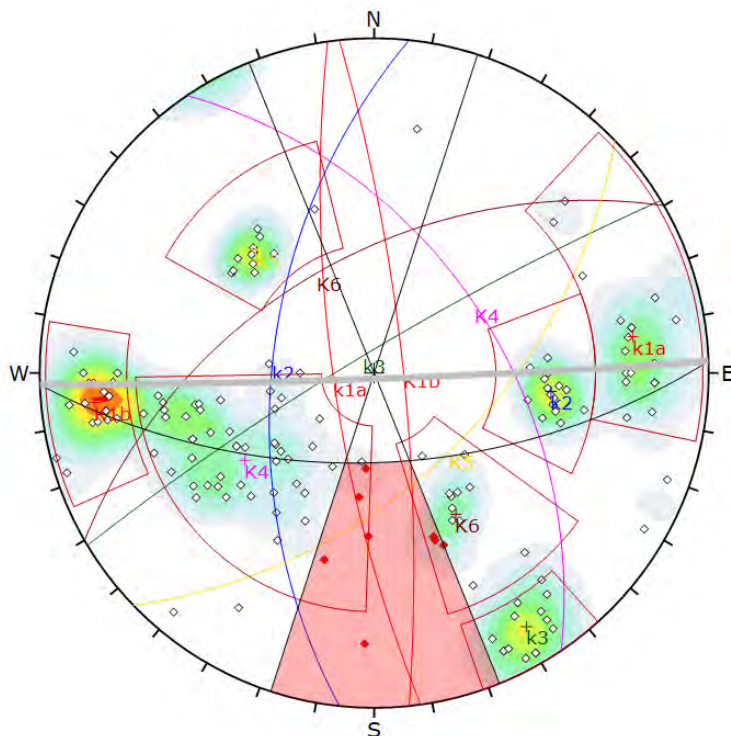
Kinematic Analysis	Wedge Sliding
Slope Dip	88
Slope Dip Direction	178
Friction Angle	28°

	Critical	Total	%
Wedge Sliding	5	21	23.81%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	282	k1a
9m	83	329	k3
10m	52	330	K6
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersections Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F5



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors

Color	Density Concentrations
0.00	~ 1.00
1.00	~ 2.00
2.00	~ 3.00
3.00	~ 4.00
4.00	~ 5.00
5.00	~ 6.00
6.00	~ 7.00
7.00	~ 8.00
8.00	~ 9.00
9.00	~ 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

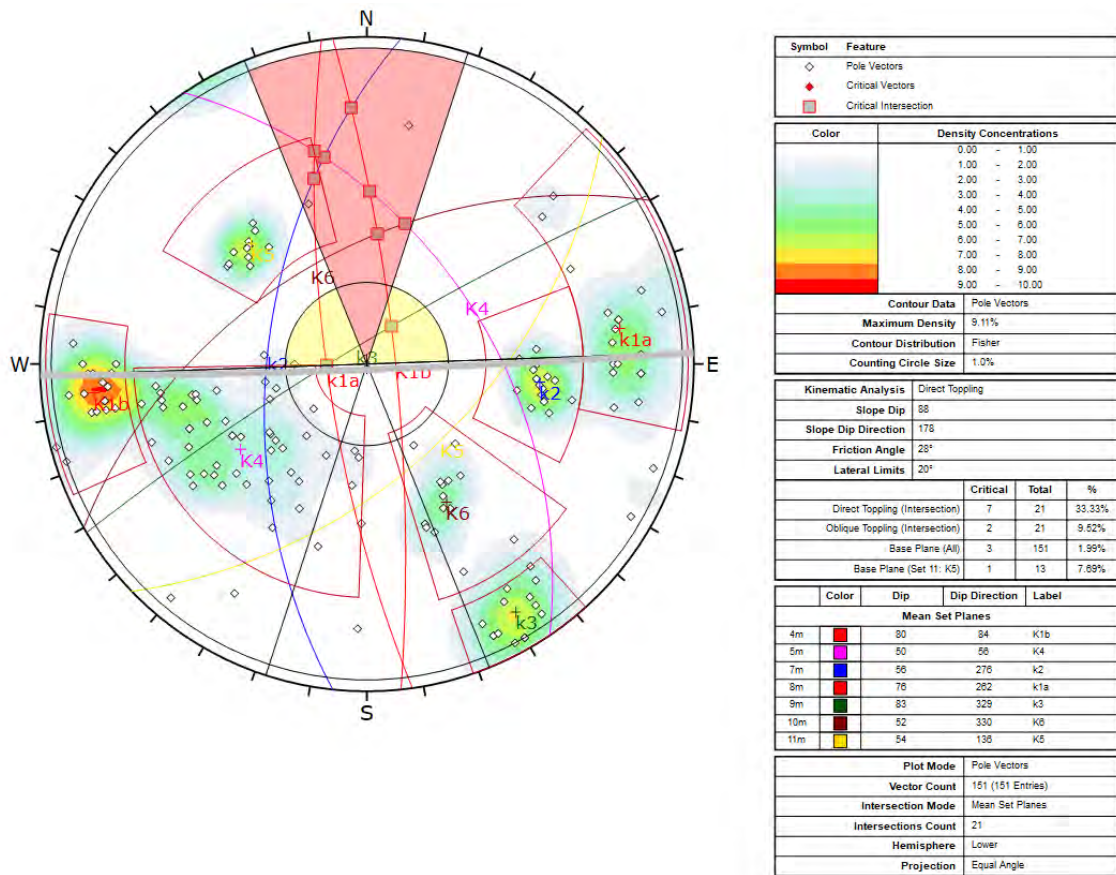
Kinematic Analysis	Flexural Toppling
Slope Dip	88
Slope Dip Direction	178
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Flexural Toppling (All)	9	151	5.96%
Flexural Toppling (Set 5: K4)	4	50	8.00%
Flexural Toppling (Set 10: K6)	4	15	26.67%

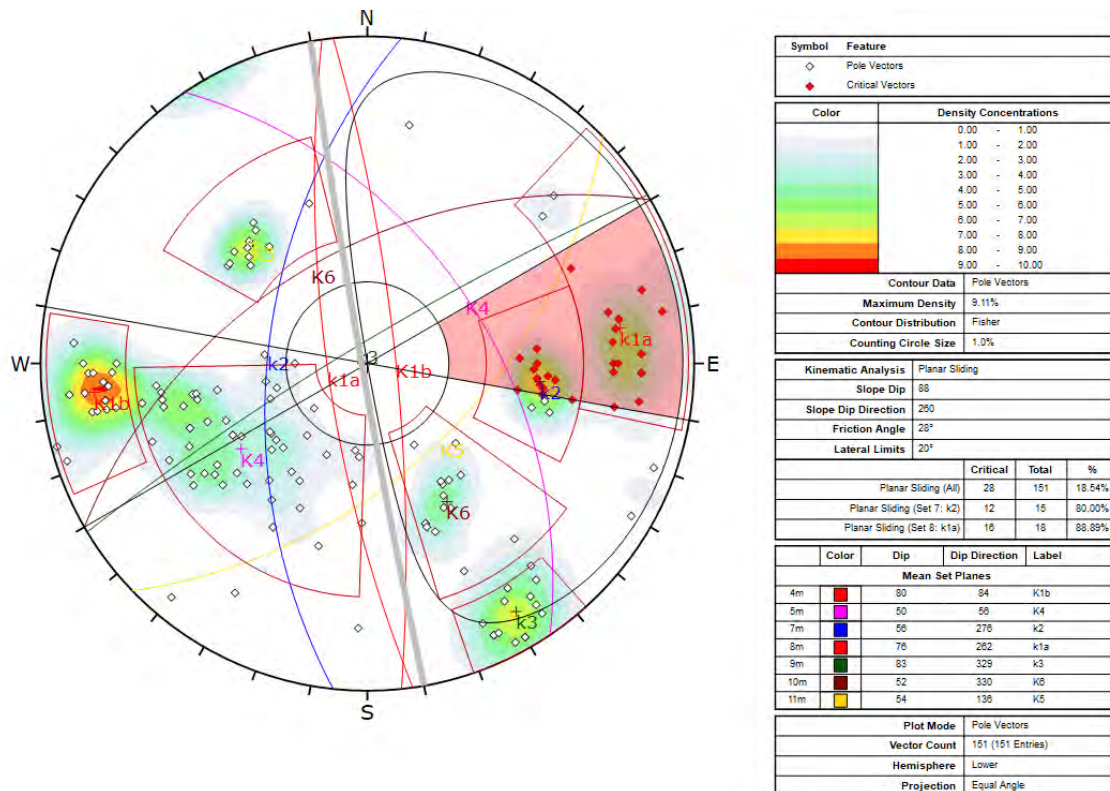
Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	282	k1a
9m	83	329	k3
10m	52	330	K6
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Hemisphere	Lower
Projection	Equal Angle

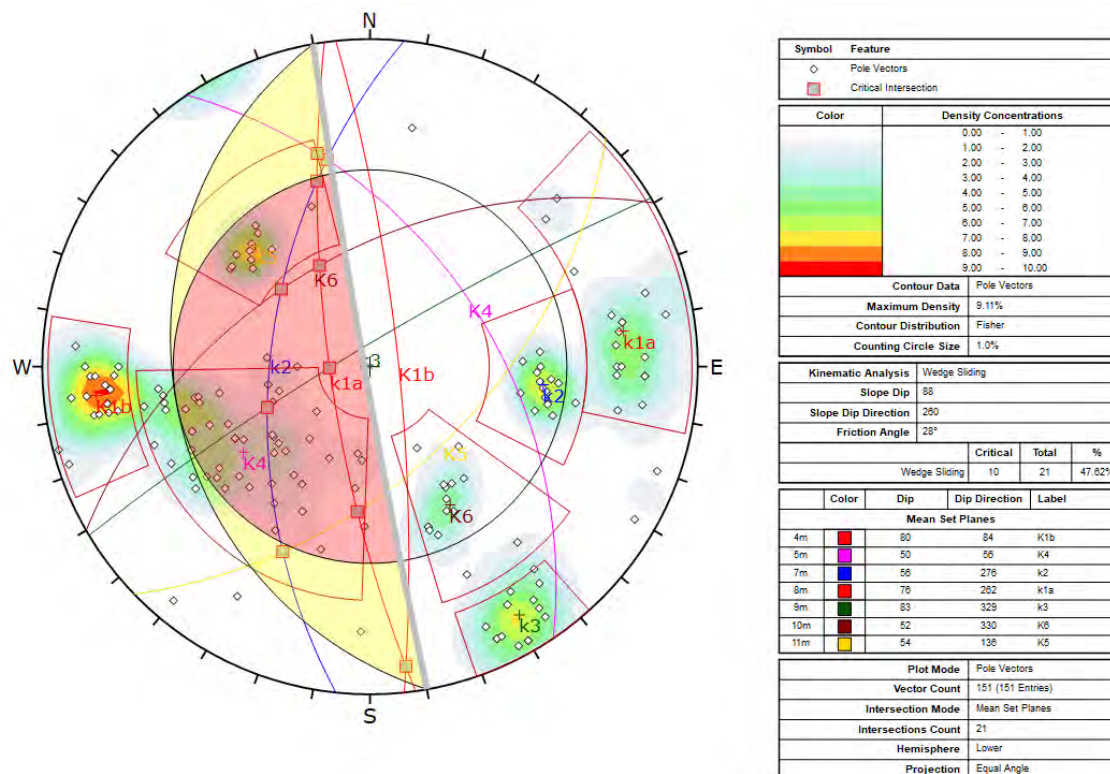
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F5



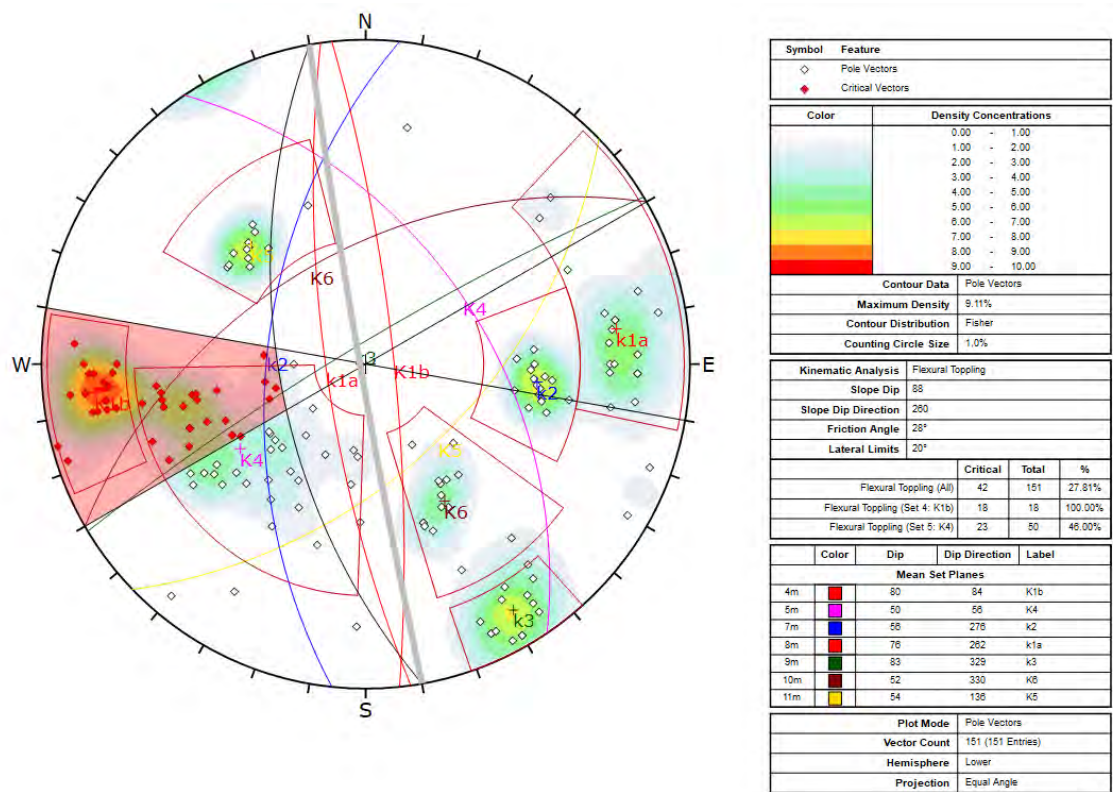
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F5



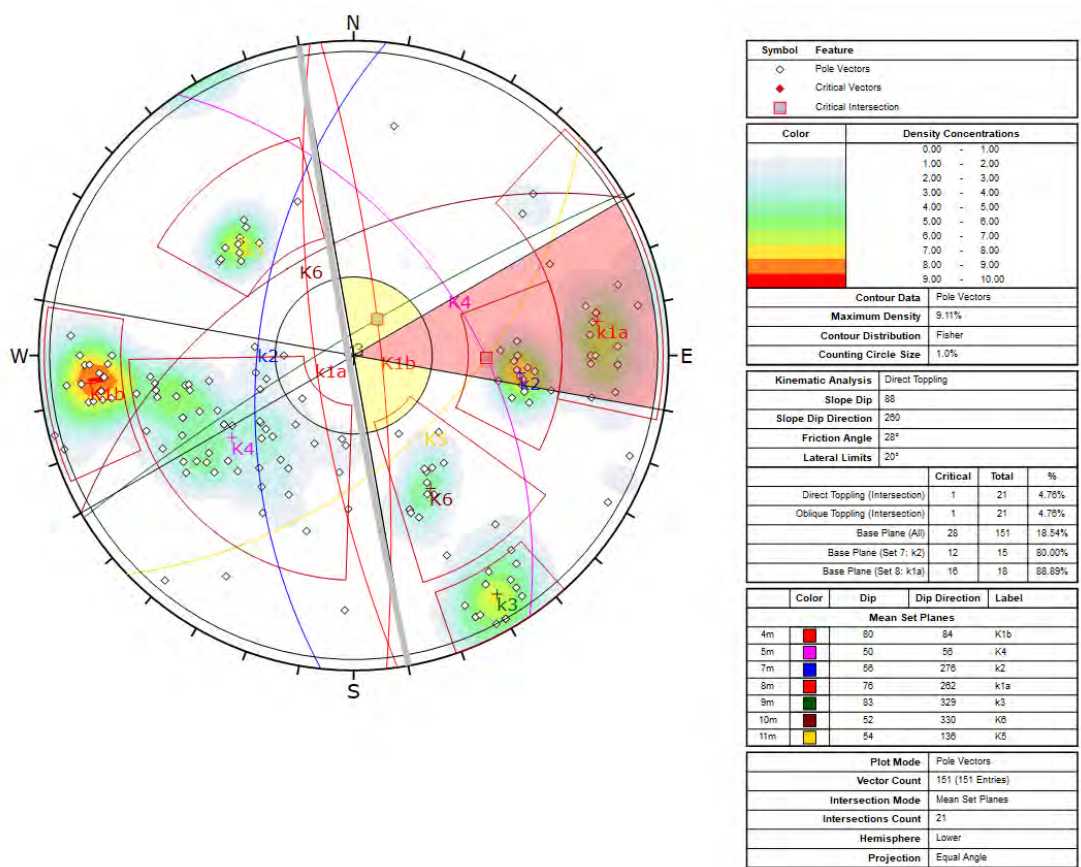
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA
LUNGO IL FRONTE F6



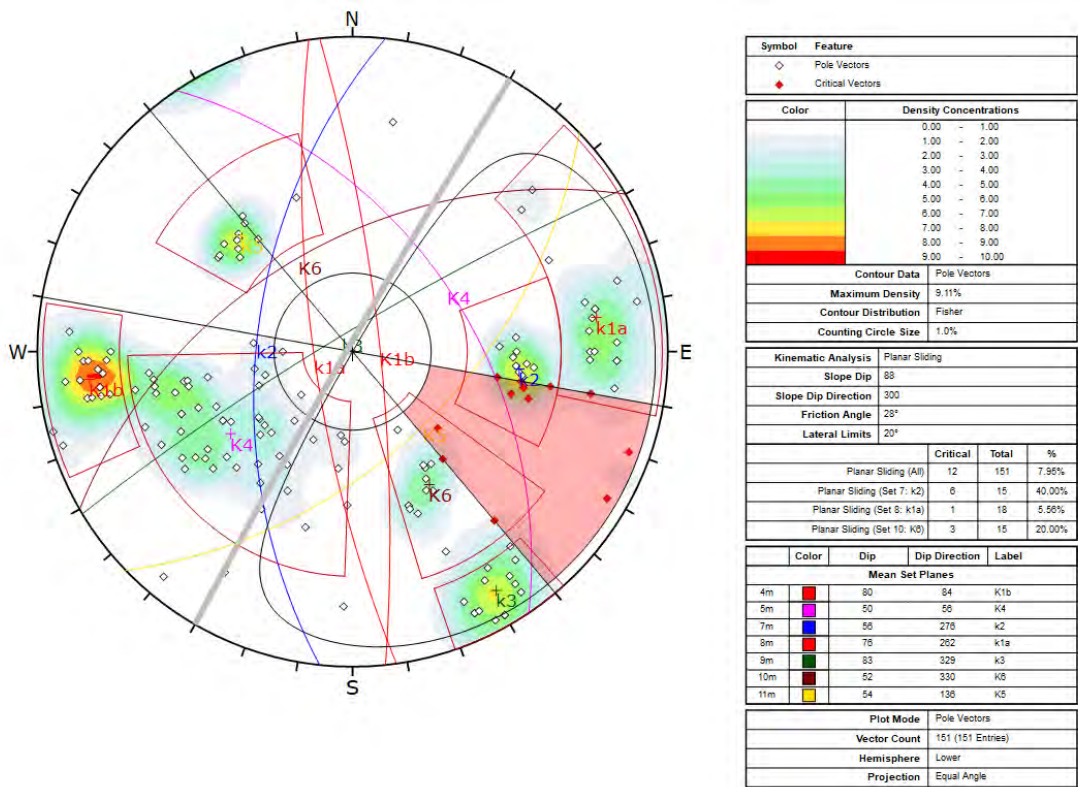
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA
DUE FRATTURE LUNGO IL FRONTE F6



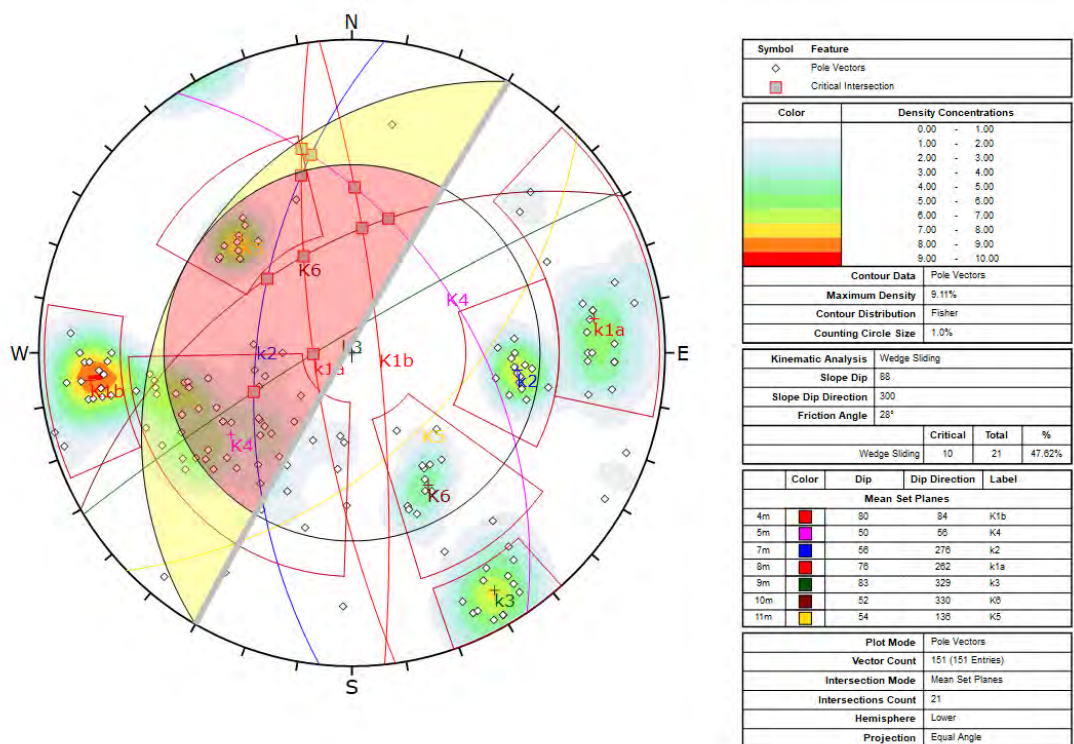
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F6



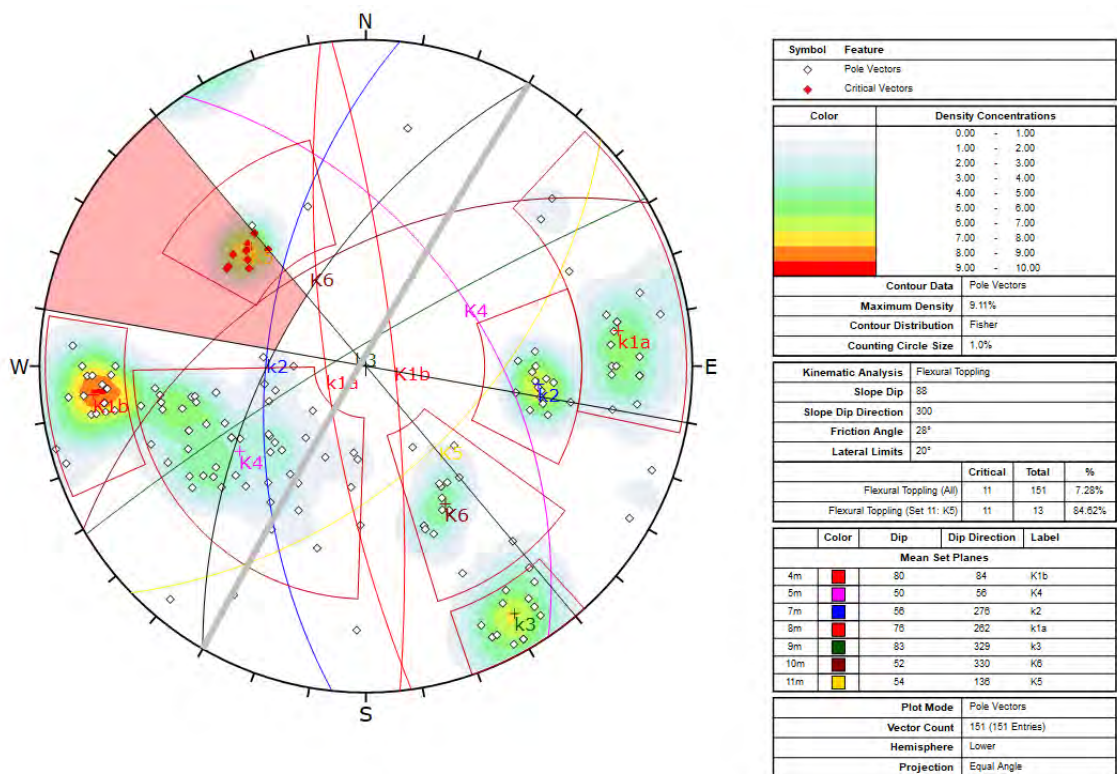
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F6



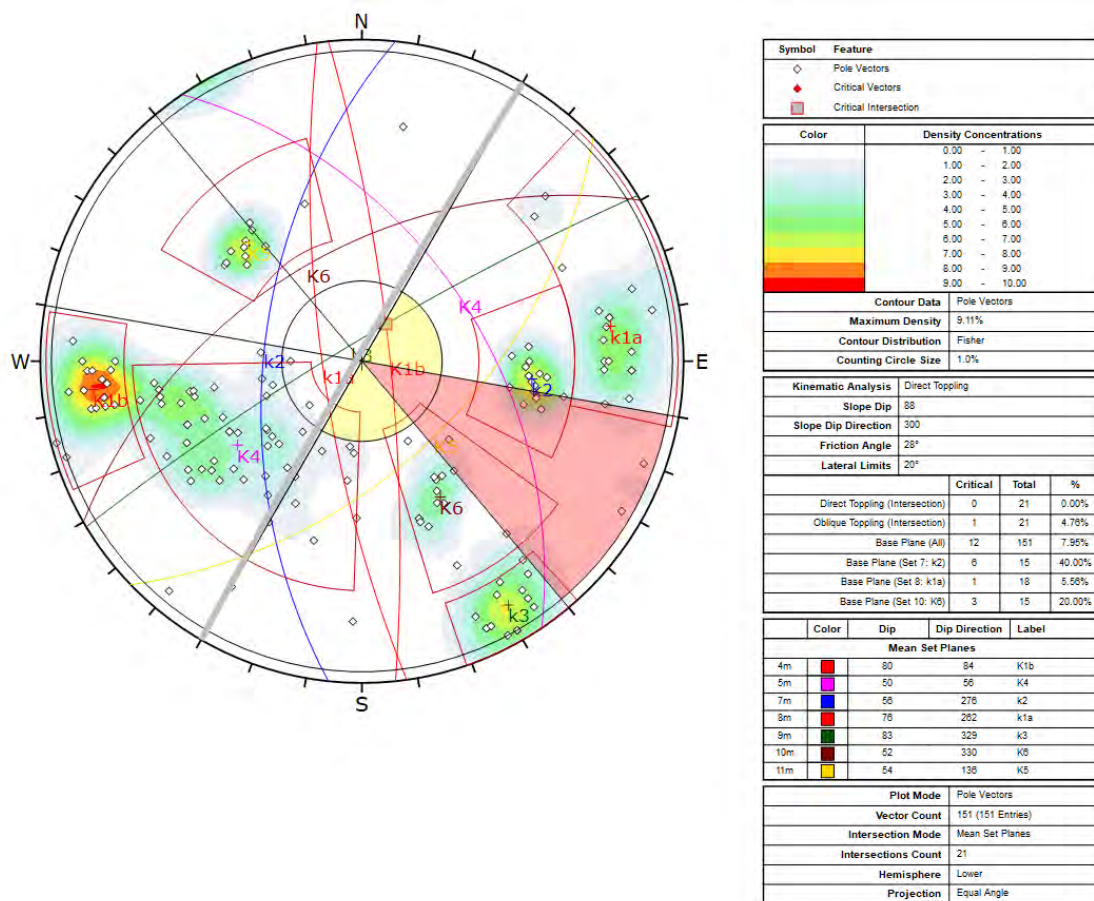
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F7



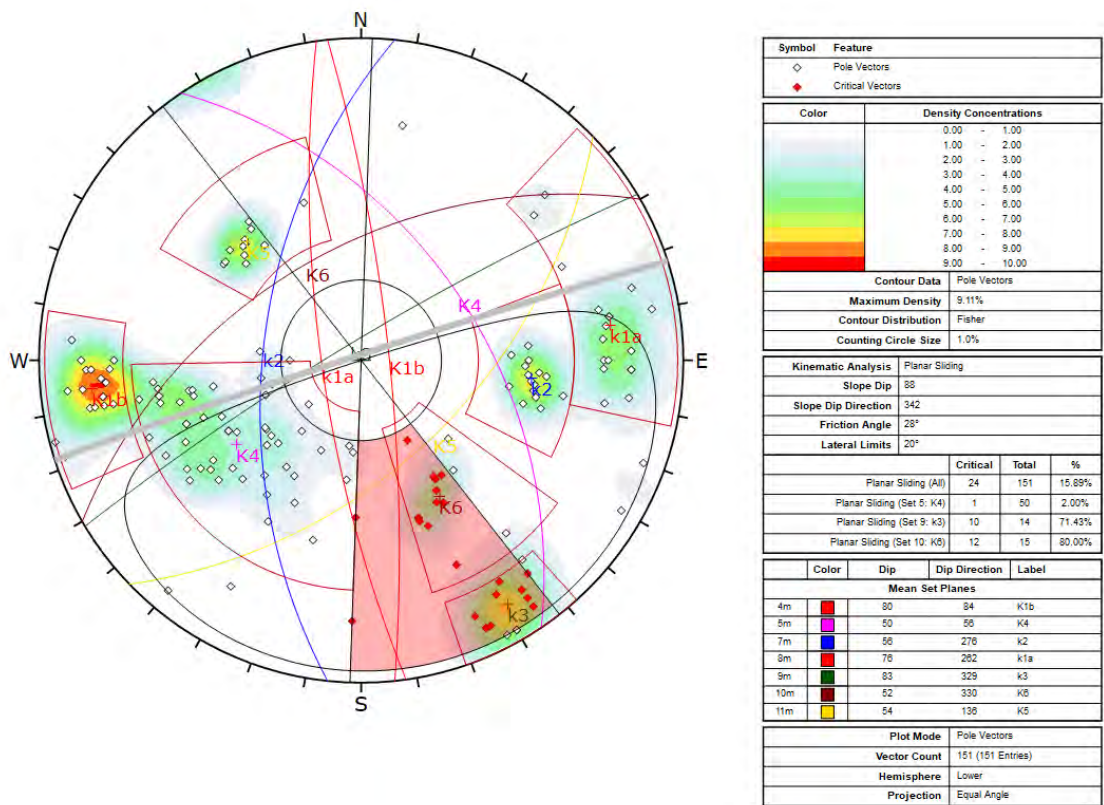
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F7



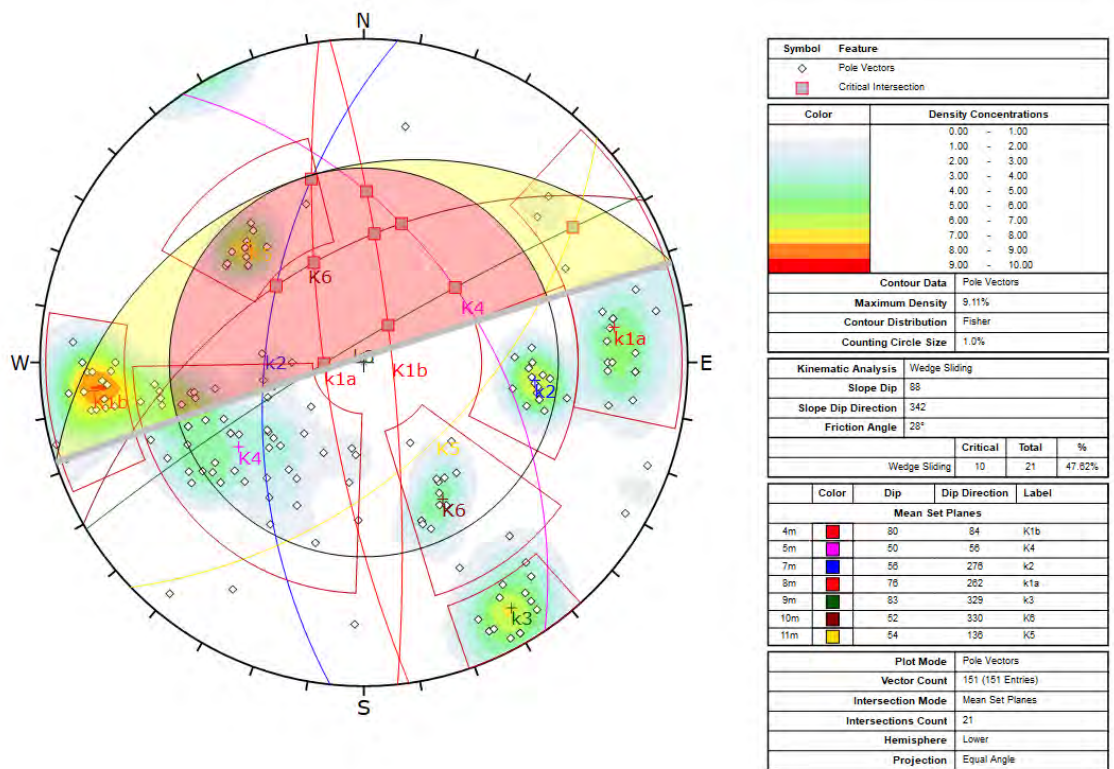
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F7



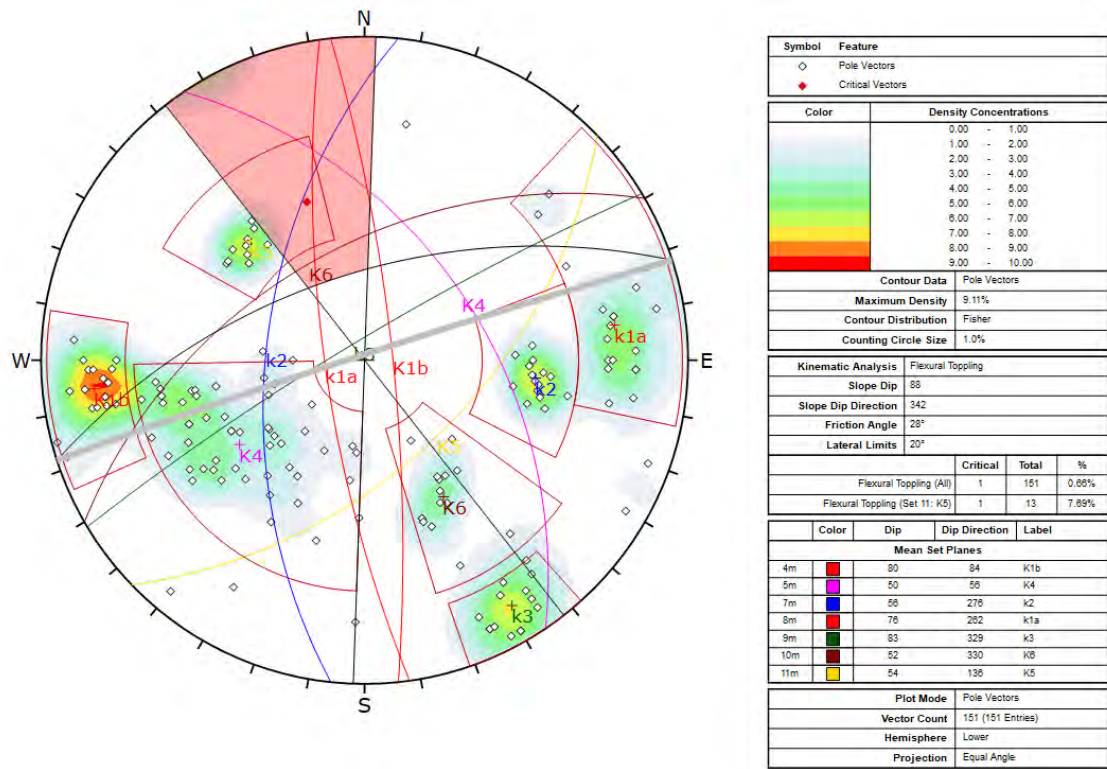
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F7



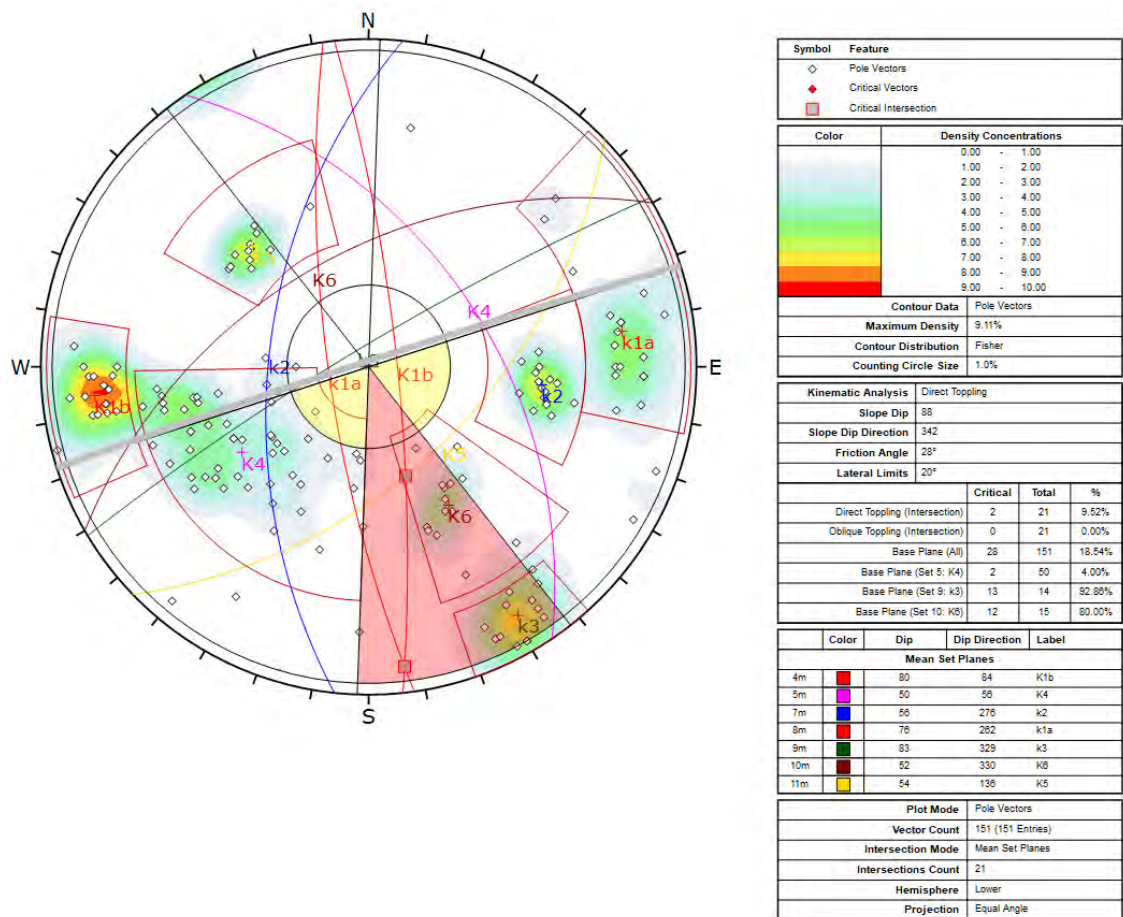
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F8



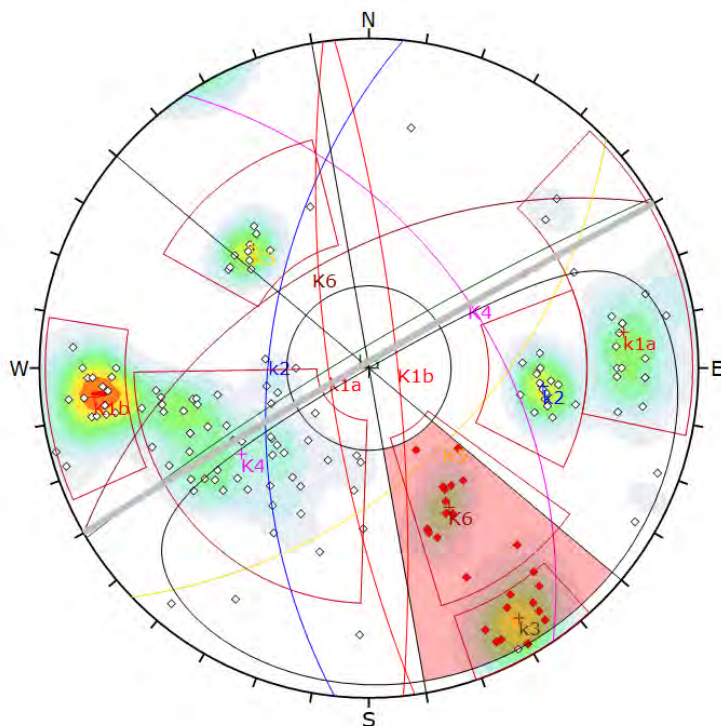
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA
DUE FRATTURE LUNGO IL FRONTE F8



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA
(FLEXURAL TOPPLING) LUNGO IL FRONTE F8



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F8



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors

Color	Density Concentrations
0.00 - 1.00	
1.00 - 2.00	
2.00 - 3.00	
3.00 - 4.00	
4.00 - 5.00	
5.00 - 6.00	
6.00 - 7.00	
7.00 - 8.00	
8.00 - 9.00	
9.00 - 10.00	

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

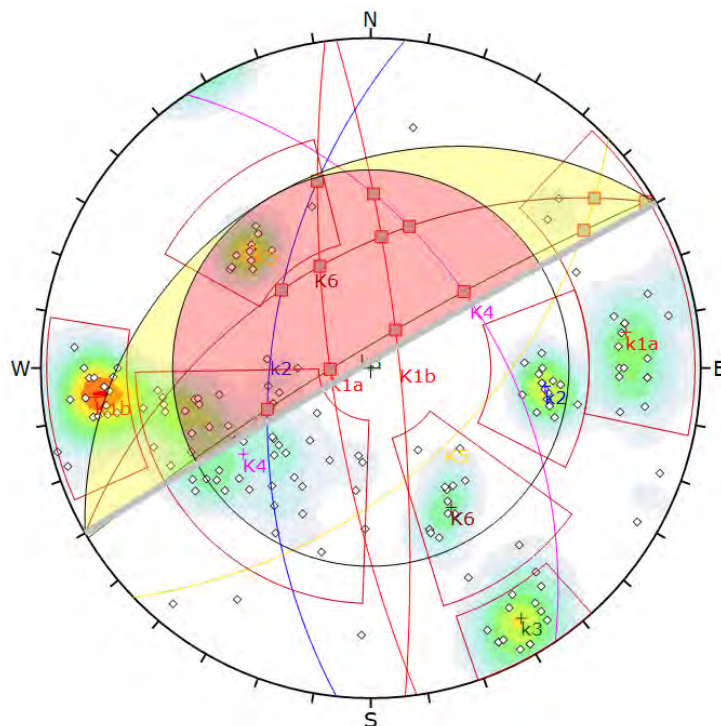
Kinematic Analysis	Planar Sliding
Slope Dip	88
Slope Dip Direction	330
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	28	151	18.54%
Planar Sliding (Set 9: k3)	13	14	92.86%
Planar Sliding (Set 10: K5)	15	15	100.00%

Color	Dip	Dip Direction	Label
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	262	k1a
9m	83	329	k3
10m	52	330	K5
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F9



Symbol	Feature
◇	Pole Vectors
◆	Critical Intersection

Color	Density Concentrations
0.00 - 1.00	
1.00 - 2.00	
2.00 - 3.00	
3.00 - 4.00	
4.00 - 5.00	
5.00 - 6.00	
6.00 - 7.00	
7.00 - 8.00	
8.00 - 9.00	
9.00 - 10.00	

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

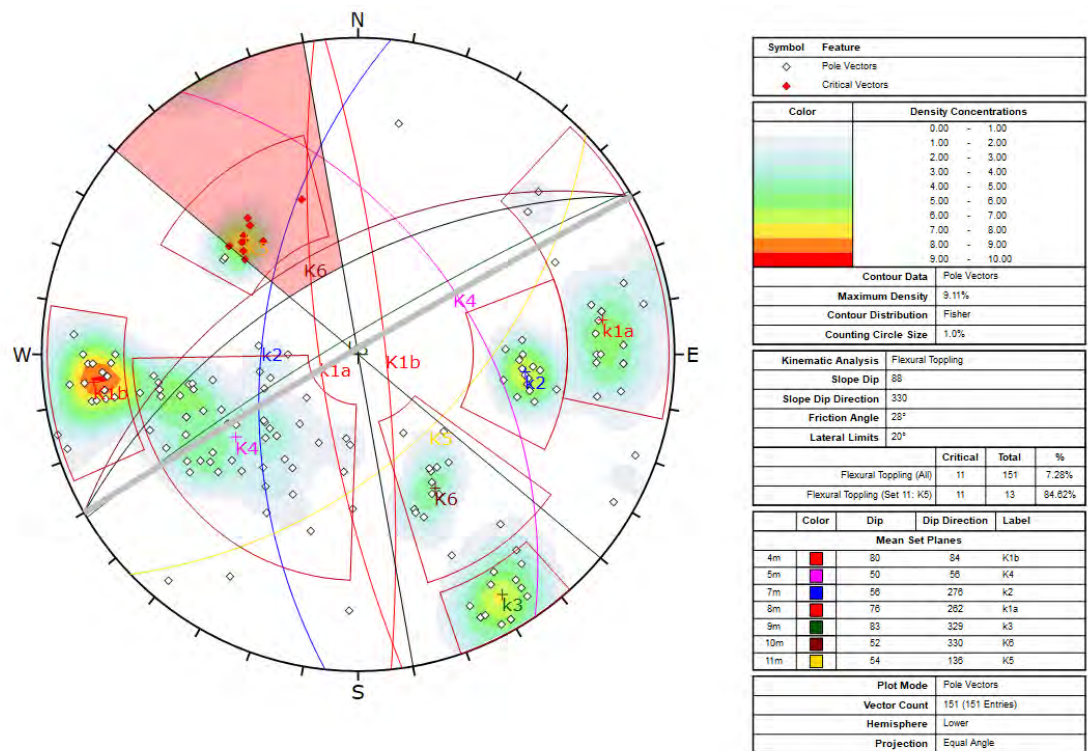
Kinematic Analysis	Wedge Sliding
Slope Dip	88
Slope Dip Direction	330
Friction Angle	28°

	Critical	Total	%
Wedge Sliding	13	21	61.90%

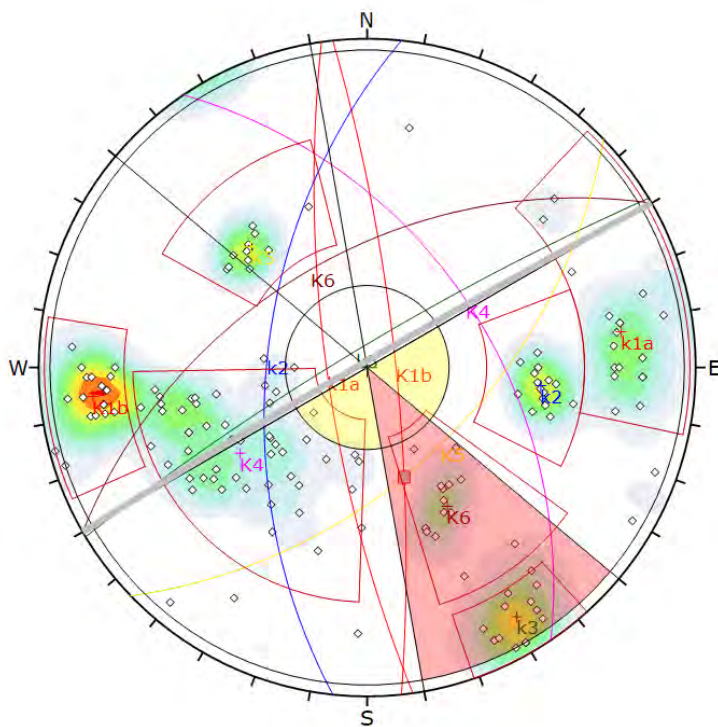
Color	Dip	Dip Direction	Label
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	262	k1a
9m	83	329	k3
10m	52	330	K5
11m	54	136	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersection Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F9



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F9



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

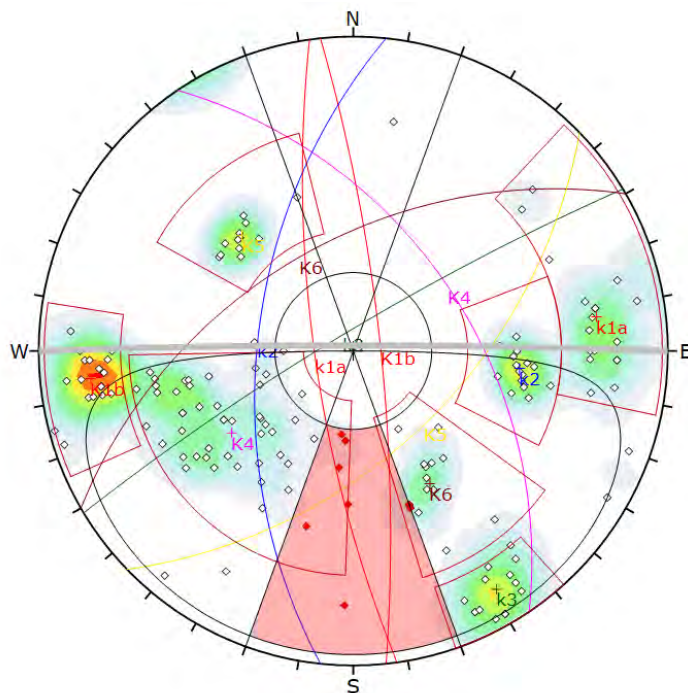
Kinematic Analysis	Direct Toppling
Slope Dip	88
Slope Dip Direction	330
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	1	21	4.78%
Oblique Toppling (Intersection)	0	21	0.00%
Base Plane (All)	30	151	19.87%
Base Plane (Set 5: K4)	1	50	2.00%
Base Plane (Set 9: K3)	14	14	100.00%
Base Plane (Set 10: K5)	15	15	100.00%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	58	276	K2
8m	76	282	K1a
9m	83	329	K3
10m	52	330	K5
11m	54	138	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Intersection Mode	Mean Set Planes
Intersections Count	21
Hemisphere	Lower
Projection	Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F9



Symbol	Feature
◇	Pole Vectors
◆	Critical Vectors

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

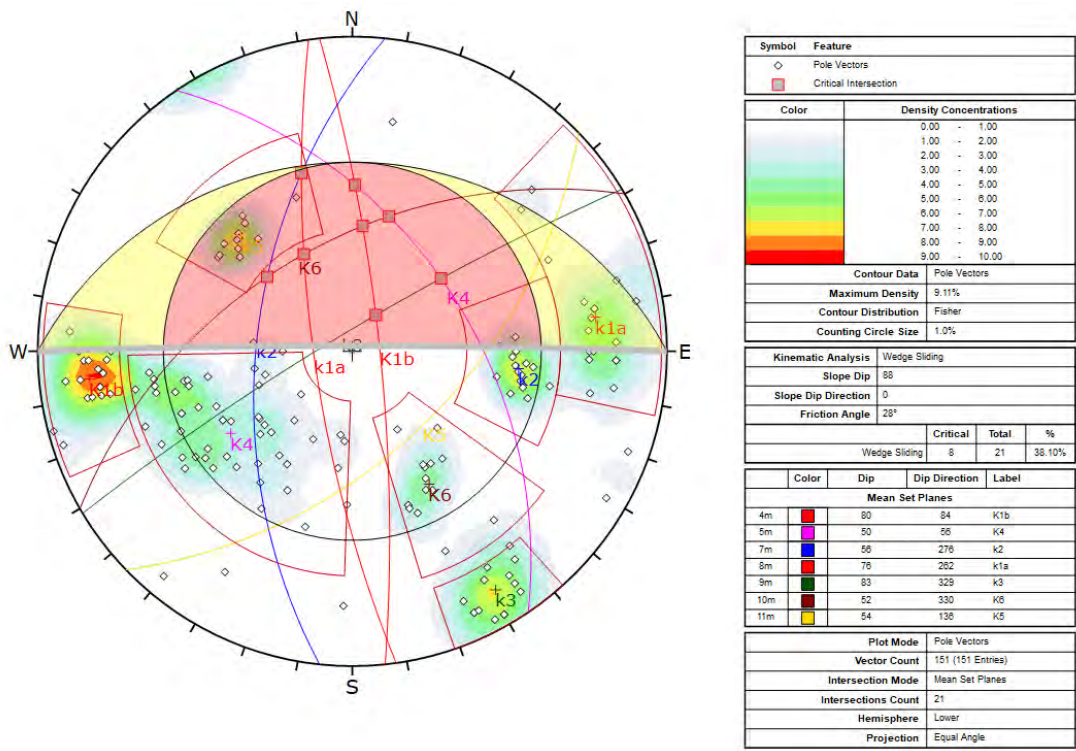
Kinematic Analysis	Planar Sliding
Slope Dip	88
Slope Dip Direction	0
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	9	151	5.96%
Planar Sliding (Set 5: K4)	5	50	10.00%
Planar Sliding (Set 10: K5)	3	15	20.00%

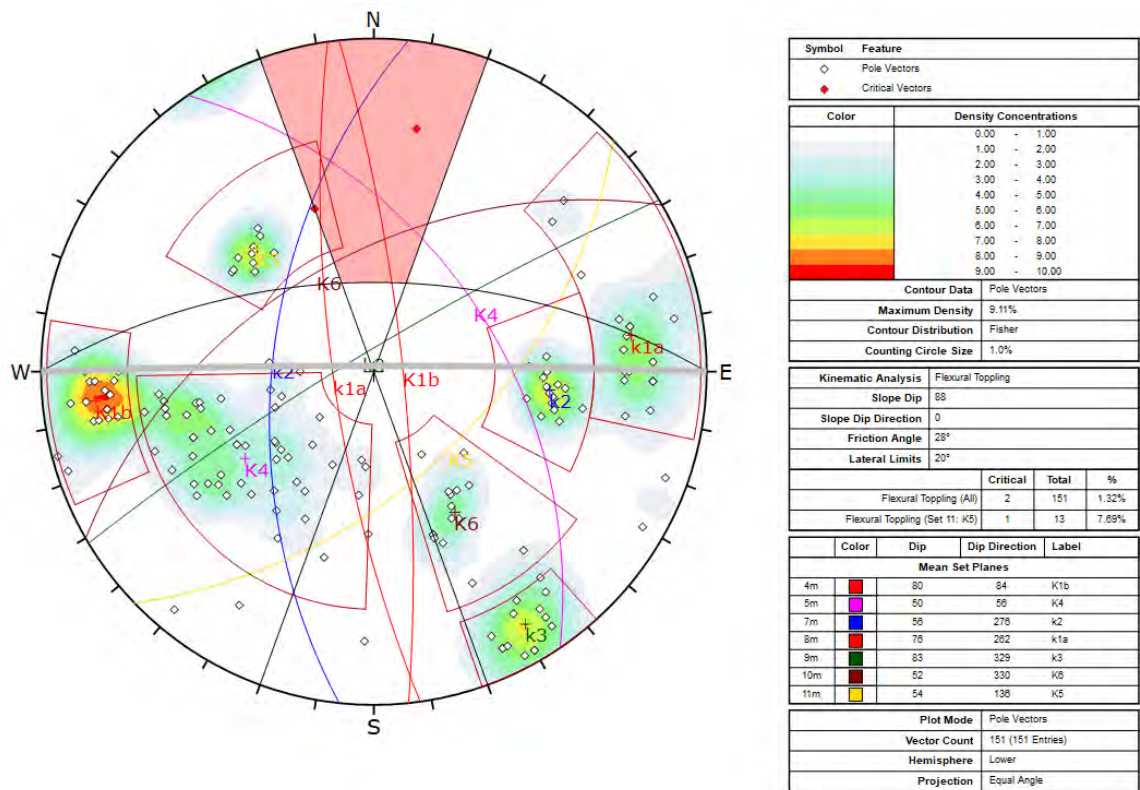
Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	58	276	K2
8m	76	282	K1a
9m	83	329	K3
10m	52	330	K5
11m	54	138	K5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)
Hemisphere	Lower
Projection	Equal Angle

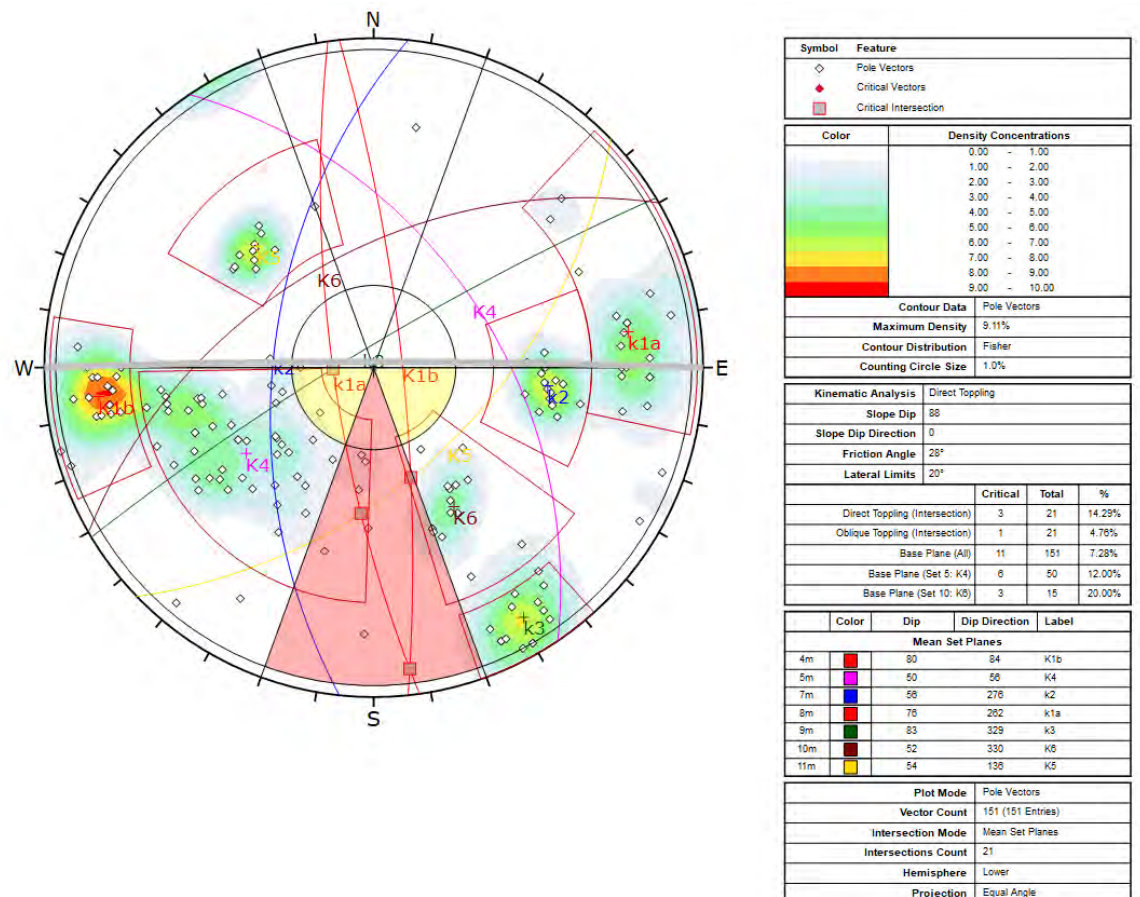
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA
LUNGO IL FRONTE F10



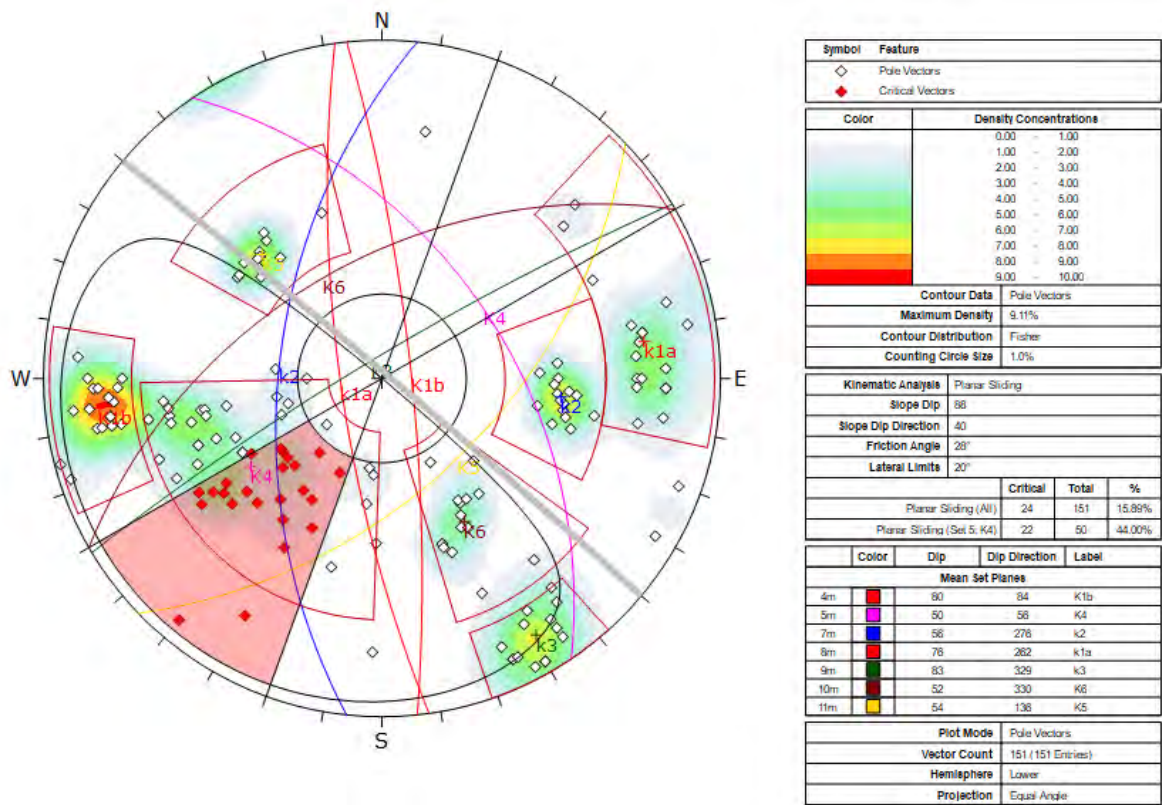
VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA
DUE FRATTURE LUNGO IL FRONTE F10



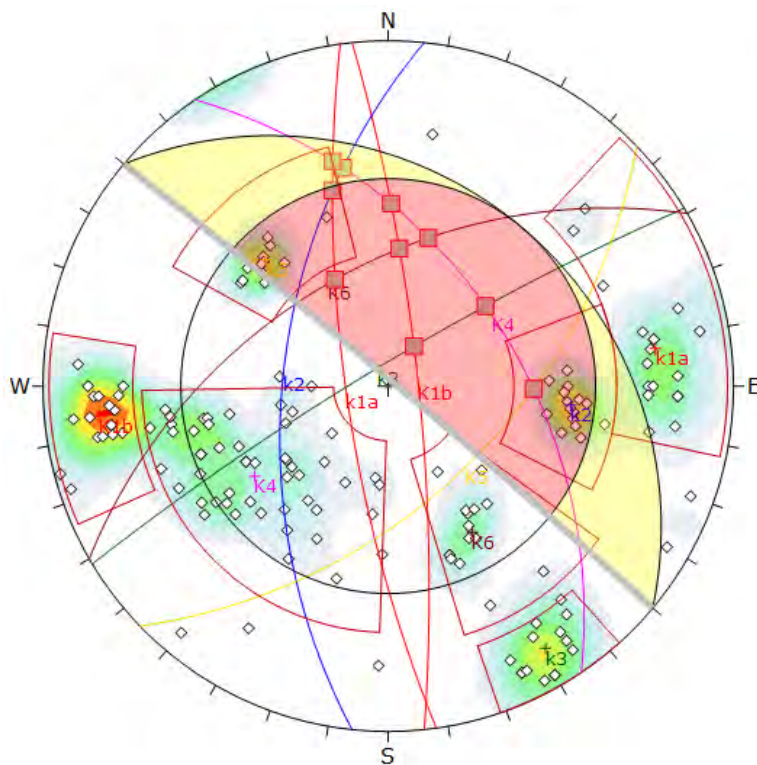
VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F10



VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F10



VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO PLANARE DI BLOCCHI LUNGO DISCONTINUITA LUNGO IL FRONTE F11



Symbol	Feature
	Pole Vectors
	Critical Intersection

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data		Pole Vectors
Maximum Density		9.11%
Contour Distribution		Fisher
Counting Circle Size		1.0%

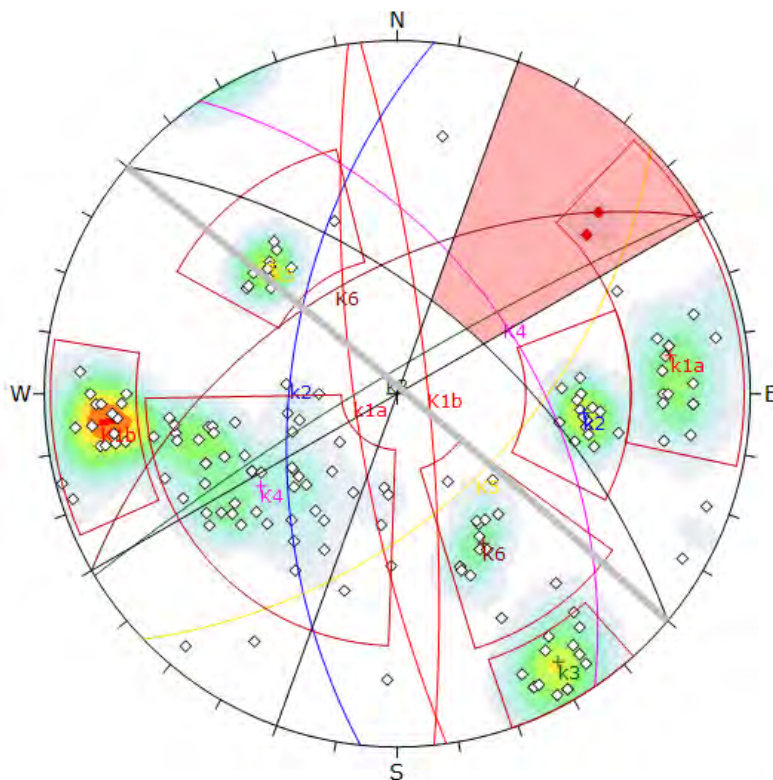
Kinematic Analysis		Wedge Sliding
Slope Dip		88
Slope Dip Direction		40
Friction Angle		28°

	Critical	Total	%
Wedge Sliding	10	21	47.62%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	56	276	K2
8m	76	262	K1a
9m	83	329	K3
10m	52	330	K6
11m	54	136	K5

Plot Mode		Pole Vectors
Vector Count		151 (151 Entries)
Intersection Mode		Mean Set Planes
Intersections Count		21
Hemisphere		Lower
Projection		Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' ALLO SCIVOLAMENTO DI CUNEI LUNGO LINEA DI INTERSEZIONE TRA DUE FRATTURE LUNGO IL FRONTE F11



Symbol	Feature
	Pole Vectors
	Critical Vectors

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data		Pole Vectors
Maximum Density		9.11%
Contour Distribution		Fisher
Counting Circle Size		1.0%

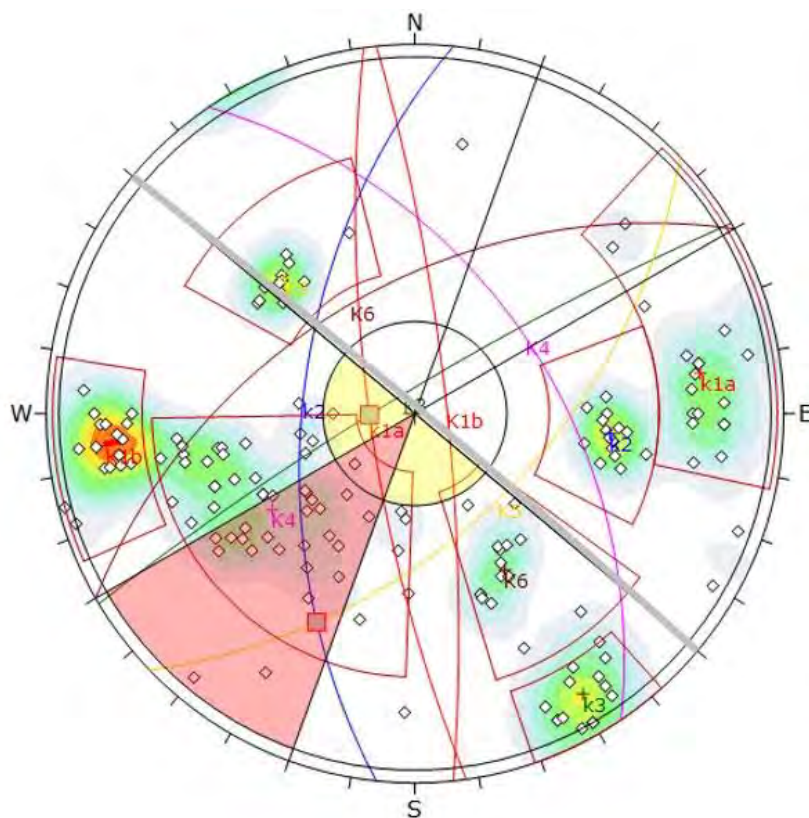
Kinematic Analysis		Flexural Toppling
Slope Dip		88
Slope Dip Direction		40
Friction Angle		28°
Lateral Limits		20°

	Critical	Total	%
Flexural Toppling (All)	2	151	1.32%
Flexural Toppling (Set B: K1a)	2	18	11.11%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	58	K4
7m	56	276	K2
8m	76	262	K1a
9m	83	329	K3
10m	52	330	K6
11m	54	136	K5

Plot Mode		Pole Vectors
Vector Count		151 (151 Entries)
Hemisphere		Lower
Projection		Equal Angle

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DI STRUTTURE COLONNARI PER FLESSURA (FLEXURAL TOPPLING) LUNGO IL FRONTE F11



Symbol	Feature
	Pole Vectors
	Critical Vectors
	Critical Intersection

Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.11%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Direct Toppling
Slope Dip	88
Slope Dip Direction	40
Friction Angle	28°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	1	21	4.76%
Oblique Toppling (Intersection)	1	21	4.76%
Base Plane (All)	26	151	17.22%
Base Plane (Set 5: K4)	23	50	46.00%

Color	Dip	Dip Direction	Label
Mean Set Planes			
4m	80	84	K1b
5m	50	56	K4
7m	56	276	k2
8m	76	262	k1a
9m	83	329	k3
10m	52	300	k6
11m	54	136	k5

Plot Mode	Pole Vectors
Vector Count	151 (151 Entries)

VALUTAZIONE DELLA SUSCETTIBILITA' AL RIBALTAMENTO DIRETTO DI STRUTTURE COLONNARI (DIRECT TOPPLING) LUNGO IL FRONTE F11

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 338
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	25	16.56%	151
Set 9: k3	11	78.57%	14
Set 10: K6	14	93.33%	15

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	87	57.62%	151
Set 5: K4	29	58.00%	50
Set 7: k2	15	100.00%	15
Set 8: k1a	13	72.22%	18
Set 9: k3	11	78.57%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	3857	34.08%	2076	18.35%	11316
All Set Planes	2994	36.32%	1502	18.22%	8243
Set 4: K1b vs Set 5: K4 Planes	504	56.00%	62	6.89%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	5	1.85%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	7	2.16%	324
Set 4: K1b vs Set 9: k3 Planes	252	100.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	202	74.81%	68	25.19%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	267	35.60%	12	1.60%	750
Set 5: K4 vs Set 8: k1a Planes	333	37.00%	27	3.00%	900
Set 5: K4 vs Set 9: k3 Planes	422	60.29%	275	39.29%	700
Set 5: K4 vs Set 10: K6 Planes	484	64.53%	261	34.80%	750
Set 5: K4 vs Set 11: K5 Planes	7	1.08%	50	7.69%	650
Set 7: k2 vs Set 8: k1a Planes	124	45.93%	5	1.85%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	87	41.43%	210
Set 7: k2 vs Set 10: K6 Planes	113	50.22%	112	49.78%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	1	0.40%	179	71.03%	252
Set 8: k1a vs Set 10: K6 Planes	189	70.00%	81	30.00%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	8	3.81%	75	35.71%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	96	52.75%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	100	51.28%	195
User and Mean Set (Unweighted) Plane Intersections	7	33.33%	4	19.05%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	7	33.33%	4	19.05%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	4	2.65%	151
Set 11: K5	4	30.77%	13

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	29	19.21%	151
Set 5: K4	1	2.00%	50
Set 9: k3	14	100.00%	14
Set 10: K6	14	93.33%	15

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	831	7.34%	182	1.61%	11316
All Set Planes	575	6.98%	30	0.36%	8243
Set 4: K1b vs Set 5: K4 Planes	32	3.56%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	3	1.11%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	133	41.05%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	227	97.01%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	104	11.56%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	15	2.31%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	30	11.90%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	61	26.07%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	2	9.52%	0	0.00%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	2	9.52%	0	0.00%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15

Entries: 15

Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13

Entries: 13

Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 63
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	41	27.15%	151
Set 4: K1b	6	33.33%	18
Set 5: K4	35	70.00%	50

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	85	56.29%	151
Set 4: K1b	16	88.89%	18
Set 5: K4	49	98.00%	50
Set 10: K6	4	26.67%	15
Set 11: K5	12	92.31%	13

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	2876	25.42%	3834	33.88%	11316
All Set Planes	2164	26.25%	2762	33.51%	8243
Set 4: K1b vs Set 5: K4 Planes	134	14.89%	611	67.89%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	123	45.56%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	62	19.14%	324
Set 4: K1b vs Set 9: k3 Planes	248	98.41%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	256	94.81%	14	5.19%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	5	2.14%	234
Set 5: K4 vs Set 7: k2 Planes	15	2.00%	553	73.73%	750
Set 5: K4 vs Set 8: k1a Planes	32	3.56%	606	67.33%	900
Set 5: K4 vs Set 9: k3 Planes	509	72.71%	142	20.29%	700
Set 5: K4 vs Set 10: K6 Planes	297	39.60%	400	53.33%	750
Set 5: K4 vs Set 11: K5 Planes	342	52.62%	238	36.62%	650
Set 7: k2 vs Set 8: k1a Planes	67	24.81%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	30	13.33%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	132	48.89%	8	2.96%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	14	6.67%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	4	19.05%	6	28.57%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	4	19.05%	6	28.57%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	9	5.96%	151
Set 8: k1a	9	50.00%	18

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	44	29.14%	151
Set 4: K1b	7	38.89%	18
Set 5: K4	36	72.00%	50

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	613	5.42%	359	3.17%	11316
All Set Planes	440	5.34%	178	2.16%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	0	0.00%	1	0.31%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	0	0.00%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	3	1.11%	270
Set 7: k2 vs Set 9: k3 Planes	209	99.52%	1	0.48%	210
Set 7: k2 vs Set 10: K6 Planes	10	4.44%	2	0.89%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	107	42.46%	145	57.54%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	26	9.63%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	85	40.48%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	14	7.69%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	15	7.69%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	1	4.76%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 158
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	4	2.65%	151
Set 11: K5	4	30.77%	13

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	44	29.14%	151
Set 4: K1b	14	77.78%	18
Set 5: K4	13	26.00%	50
Set 8: k1a	2	11.11%	18
Set 11: K5	13	100.00%	13

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)
 Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	1301	11.50%	873	7.71%	11316
All Set Planes	719	8.72%	667	8.09%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	62	19.14%	1	0.31%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	227	97.01%	7	2.99%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	15	1.67%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	73	11.23%	486	74.77%	650
Set 7: k2 vs Set 8: k1a Planes	1	0.37%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	92	43.81%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	37	18.97%	125	64.10%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	211	90.17%	23	9.83%	234
Set 9: k3 vs Set 10: K6 Planes	1	0.48%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	14	7.69%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	11	5.64%	195
User and Mean Set (Unweighted) Plane Intersections	2	9.52%	2	9.52%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	2	9.52%	2	9.52%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	28	18.54%	151
Set 9: k3	14	100.00%	14
Set 10: K6	14	93.33%	15

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	5	3.31%	151
Set 11: K5	4	30.77%	13

Critical 1 = Direct Toppling (Intersection)
Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	2772	24.50%	813	7.18%	11316
All Set Planes	2376	28.82%	597	7.24%	8243
Set 4: K1b vs Set 5: K4 Planes	258	28.67%	7	0.78%	900
Set 4: K1b vs Set 7: k2 Planes	153	56.67%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	98	30.25%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	17	6.75%	233	92.46%	252
Set 4: K1b vs Set 10: K6 Planes	40	14.81%	15	5.56%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	631	84.13%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	618	68.67%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	92	13.14%	700
Set 5: K4 vs Set 10: K6 Planes	117	15.60%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	152	56.30%	3	1.11%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	8	3.81%	210
Set 7: k2 vs Set 10: K6 Planes	85	37.78%	2	0.89%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	5	1.98%	217	86.11%	252
Set 8: k1a vs Set 10: K6 Planes	202	74.81%	20	7.41%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	5	23.81%	2	9.52%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	5	23.81%	2	9.52%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 91
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	29	19.21%	151
Set 4: K1b	16	88.89%	18
Set 5: K4	12	24.00%	50

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	80	52.98%	151
Set 4: K1b	16	88.89%	18
Set 5: K4	48	96.00%	50
Set 11: K5	13	100.00%	13

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)
 Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	1540	13.61%	3280	28.99%	11316
All Set Planes	932	11.31%	2352	28.53%	8243
Set 4: K1b vs Set 5: K4 Planes	3	0.33%	441	49.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	38	14.07%	270
Set 4: K1b vs Set 8: k1a Planes	53	16.36%	89	27.47%	324
Set 4: K1b vs Set 9: k3 Planes	14	5.56%	210	83.33%	252
Set 4: K1b vs Set 10: K6 Planes	13	4.81%	157	58.15%	270
Set 4: K1b vs Set 11: K5 Planes	11	4.70%	223	95.30%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	34	4.53%	750
Set 5: K4 vs Set 8: k1a Planes	15	1.67%	68	7.56%	900
Set 5: K4 vs Set 9: k3 Planes	229	32.71%	437	62.43%	700
Set 5: K4 vs Set 10: K6 Planes	43	5.73%	501	66.80%	750
Set 5: K4 vs Set 11: K5 Planes	518	79.69%	76	11.69%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	1	0.37%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	62	26.50%	234
Set 9: k3 vs Set 10: K6 Planes	14	6.67%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	9	4.95%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	7	3.59%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	6	28.57%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	6	28.57%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	31	20.53%	151
Set 7: k2	15	100.00%	15
Set 8: k1a	15	83.33%	18

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	32	21.19%	151
Set 4: K1b	17	94.44%	18
Set 5: K4	13	26.00%	50

Critical 1 = Direct Toppling (Intersection)
Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	474	4.19%	362	3.20%	11316
All Set Planes	285	3.46%	146	1.77%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	0	0.00%	2	0.62%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	18	7.14%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	4	1.48%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	0	0.00%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	14	5.19%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	74	35.24%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	29	12.89%	1	0.44%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	161	63.89%	91	36.11%	252
Set 8: k1a vs Set 10: K6 Planes	6	2.22%	30	11.11%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	1	0.48%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	0	0.00%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	0	0.00%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15

Entries: 15

Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13

Entries: 13

Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 178
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	2	1.32%	151
Set 11: K5	1	7.69%	13

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	20	13.25%	151
Set 7: k2	1	6.67%	15
Set 8: k1a	4	22.22%	18
Set 11: K5	13	100.00%	13

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)
 Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	1427	12.61%	583	5.15%	11316
All Set Planes	901	10.93%	420	5.10%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	62	19.14%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	223	95.30%	11	4.70%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	15	1.67%	7	0.78%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	34	5.23%	324	49.85%	650
Set 7: k2 vs Set 8: k1a Planes	1	0.37%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	209	99.52%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	11	4.89%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	52	26.67%	39	20.00%	195
Set 8: k1a vs Set 9: k3 Planes	58	23.02%	30	11.90%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	229	97.86%	2	0.85%	234
Set 9: k3 vs Set 10: K6 Planes	7	3.33%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	5	2.75%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	2	1.03%	195
User and Mean Set (Unweighted) Plane Intersections	3	14.29%	2	9.52%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	3	14.29%	2	9.52%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	9	5.96%	151
Set 5: K4	4	8.00%	50
Set 10: K6	4	26.67%	15

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	3	1.99%	151
Set 11: K5	1	7.69%	13

Critical 1 = Direct Toppling (Intersection)
Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	4181	36.95%	701	6.19%	11316
All Set Planes	3505	42.52%	470	5.70%	8243
Set 4: K1b vs Set 5: K4 Planes	804	89.33%	7	0.78%	900
Set 4: K1b vs Set 7: k2 Planes	246	91.11%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	154	47.53%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	33	13.10%	217	86.11%	252
Set 4: K1b vs Set 10: K6 Planes	260	96.30%	4	1.48%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	649	86.53%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	671	74.56%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	92	13.14%	700
Set 5: K4 vs Set 10: K6 Planes	393	52.40%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	157	58.15%	3	1.11%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	23	10.22%	2	0.89%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	113	44.84%	252
Set 8: k1a vs Set 10: K6 Planes	115	42.59%	32	11.85%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	7	33.33%	2	9.52%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	7	33.33%	2	9.52%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 260
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	28	18.54%	151
Set 7: k2	12	80.00%	15
Set 8: k1a	16	88.89%	18

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	57	37.75%	151
Set 7: k2	15	100.00%	15
Set 8: k1a	18	100.00%	18
Set 9: k3	6	42.86%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	1271	11.23%	1886	16.67%	11316
All Set Planes	867	10.52%	1601	19.42%	8243
Set 4: K1b vs Set 5: K4 Planes	36	4.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	33	12.22%	270
Set 4: K1b vs Set 8: k1a Planes	8	2.47%	106	32.72%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	26	9.63%	270
Set 4: K1b vs Set 11: K5 Planes	16	6.84%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	352	46.93%	750
Set 5: K4 vs Set 8: k1a Planes	88	9.78%	283	31.44%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	9	1.20%	49	6.53%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	4	1.48%	161	59.63%	270
Set 7: k2 vs Set 9: k3 Planes	210	100.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	19	8.44%	200	88.89%	225
Set 7: k2 vs Set 11: K5 Planes	52	26.67%	133	68.21%	195
Set 8: k1a vs Set 9: k3 Planes	180	71.43%	72	28.57%	252
Set 8: k1a vs Set 10: K6 Planes	74	27.41%	140	51.85%	270
Set 8: k1a vs Set 11: K5 Planes	164	70.09%	44	18.80%	234
Set 9: k3 vs Set 10: K6 Planes	7	3.33%	2	0.95%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	2	9.52%	8	38.10%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	2	9.52%	8	38.10%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	42	27.81%	151
Set 4: K1b	18	100.00%	18
Set 5: K4	23	46.00%	50

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	28	18.54%	151
Set 7: k2	12	80.00%	15
Set 8: k1a	16	88.89%	18

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	854	7.55%	560	4.95%	11316
All Set Planes	521	6.32%	361	4.38%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	7	0.78%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	0	0.00%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	247	98.02%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	15	5.56%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	0	0.00%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	71	10.14%	92	13.14%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	362	55.69%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	22	10.48%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	60	32.97%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	6	3.08%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	1	4.76%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 300
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	12	7.95%	151
Set 7: k2	6	40.00%	15
Set 8: k1a	1	5.56%	18
Set 10: K6	3	20.00%	15

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	69	45.70%	151
Set 5: K4	7	14.00%	50
Set 7: k2	15	100.00%	15
Set 8: k1a	18	100.00%	18
Set 9: k3	11	78.57%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	2543	22.47%	2521	22.28%	11316
All Set Planes	1726	20.94%	2125	25.78%	8243
Set 4: K1b vs Set 5: K4 Planes	496	55.11%	31	3.44%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	91	33.70%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	49	15.12%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	57	22.62%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	269	99.63%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	267	35.60%	267	35.60%	750
Set 5: K4 vs Set 8: k1a Planes	333	37.00%	175	19.44%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	4	0.57%	700
Set 5: K4 vs Set 10: K6 Planes	9	1.20%	554	73.87%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	124	45.93%	47	17.41%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	210	100.00%	210
Set 7: k2 vs Set 10: K6 Planes	153	68.00%	72	32.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	23	11.79%	195
Set 8: k1a vs Set 9: k3 Planes	158	62.70%	94	37.30%	252
Set 8: k1a vs Set 10: K6 Planes	109	40.37%	161	59.63%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	7	3.33%	15	7.14%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	5	2.75%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	1	0.51%	195
User and Mean Set (Unweighted) Plane Intersections	4	19.05%	6	28.57%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	4	19.05%	6	28.57%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	11	7.28%	151
Set 11: K5	11	84.62%	13

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	12	7.95%	151
Set 7: k2	6	40.00%	15
Set 8: k1a	1	5.56%	18
Set 10: K6	3	20.00%	15

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	640	5.66%	402	3.55%	11316
All Set Planes	262	3.18%	244	2.96%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	4	0.44%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	0	0.00%	1	0.31%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	150	59.52%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	5	0.56%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	89	12.71%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	257	39.54%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	0	0.00%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	0	0.00%	1	4.76%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15

Entries: 15

Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13

Entries: 13

Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 342
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	24	15.89%	151
Set 5: K4	1	2.00%	50
Set 9: k3	10	71.43%	14
Set 10: K6	12	80.00%	15

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	89	58.94%	151
Set 5: K4	33	66.00%	50
Set 7: k2	15	100.00%	15
Set 8: k1a	10	55.56%	18
Set 9: k3	11	78.57%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	3959	34.99%	1852	16.37%	11316
All Set Planes	3095	37.55%	1296	15.72%	8243
Set 4: K1b vs Set 5: K4 Planes	504	56.00%	55	6.11%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	1	0.37%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	5	1.54%	324
Set 4: K1b vs Set 9: k3 Planes	252	100.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	256	94.81%	13	4.81%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	267	35.60%	12	1.60%	750
Set 5: K4 vs Set 8: k1a Planes	333	37.00%	13	1.44%	900
Set 5: K4 vs Set 9: k3 Planes	422	60.29%	275	39.29%	700
Set 5: K4 vs Set 10: K6 Planes	613	81.73%	125	16.67%	750
Set 5: K4 vs Set 11: K5 Planes	9	1.38%	79	12.15%	650
Set 7: k2 vs Set 8: k1a Planes	124	45.93%	5	1.85%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	30	14.29%	210
Set 7: k2 vs Set 10: K6 Planes	53	23.56%	171	76.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	1	0.40%	164	65.08%	252
Set 8: k1a vs Set 10: K6 Planes	159	58.89%	111	41.11%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	14	6.67%	62	29.52%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	92	50.55%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	83	42.56%	195
User and Mean Set (Unweighted) Plane Intersections	7	33.33%	3	14.29%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	7	33.33%	3	14.29%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	1	0.66%	151
Set 11: K5	1	7.69%	13

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	28	18.54%	151
Set 5: K4	2	4.00%	50
Set 9: k3	13	92.86%	14
Set 10: K6	12	80.00%	15

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	824	7.28%	217	1.92%	11316
All Set Planes	583	7.07%	59	0.72%	8243
Set 4: K1b vs Set 5: K4 Planes	32	3.56%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	6	2.22%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	142	43.83%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	234	100.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	87	9.67%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	4	0.62%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	3	1.11%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	1	0.48%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	58	23.02%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	75	32.05%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	2	9.52%	0	0.00%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	2	9.52%	0	0.00%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15
 Entries: 15
 Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13
 Entries: 13
 Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 330
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	28	18.54%	151
Set 9: k3	13	92.86%	14
Set 10: K6	15	100.00%	15

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	86	56.95%	151
Set 5: K4	25	50.00%	50
Set 7: k2	15	100.00%	15
Set 8: k1a	14	77.78%	18
Set 9: k3	13	92.86%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	3539	31.27%	2371	20.95%	11316
All Set Planes	2678	32.49%	1801	21.85%	8243
Set 4: K1b vs Set 5: K4 Planes	504	56.00%	53	5.89%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	9	3.33%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	10	3.09%	324
Set 4: K1b vs Set 9: k3 Planes	144	57.14%	72	28.57%	252
Set 4: K1b vs Set 10: K6 Planes	148	54.81%	122	45.19%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	267	35.60%	34	4.53%	750
Set 5: K4 vs Set 8: k1a Planes	333	37.00%	41	4.56%	900
Set 5: K4 vs Set 9: k3 Planes	267	38.14%	218	31.14%	700
Set 5: K4 vs Set 10: K6 Planes	365	48.67%	382	50.93%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	15	2.31%	650
Set 7: k2 vs Set 8: k1a Planes	124	45.93%	11	4.07%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	168	80.00%	210
Set 7: k2 vs Set 10: K6 Planes	167	74.22%	58	25.78%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	81	32.14%	159	63.10%	252
Set 8: k1a vs Set 10: K6 Planes	206	76.30%	64	23.70%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	148	70.48%	210
Set 9: k3 vs Set 11: K5 Planes	2	1.10%	95	52.20%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	142	72.82%	195
User and Mean Set (Unweighted) Plane Intersections	8	38.10%	5	23.81%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	8	38.10%	5	23.81%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	11	7.28%	151
Set 11: K5	11	84.62%	13

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	30	19.87%	151
Set 5: K4	1	2.00%	50
Set 9: k3	14	100.00%	14
Set 10: K6	15	100.00%	15

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	740	6.54%	155	1.37%	11316
All Set Planes	475	5.76%	1	0.01%	8243
Set 4: K1b vs Set 5: K4 Planes	30	3.33%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	61	18.83%	1	0.31%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	211	90.17%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	96	10.67%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	53	8.15%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	24	10.26%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	0	0.00%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	0	0.00%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15

Entries: 15

Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13

Entries: 13

Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 0
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	9	5.96%	151
Set 5: K4	5	10.00%	50
Set 10: K6	3	20.00%	15

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	93	61.59%	151
Set 4: K1b	2	11.11%	18
Set 5: K4	49	98.00%	50
Set 7: k2	11	73.33%	15
Set 8: k1a	1	5.56%	18
Set 9: k3	11	78.57%	14
Set 10: K6	15	100.00%	15

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	3999	35.34%	1780	15.73%	11316
All Set Planes	3111	37.74%	1156	14.02%	8243
Set 4: K1b vs Set 5: K4 Planes	504	56.00%	34	3.78%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	252	100.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	256	94.81%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	267	35.60%	24	3.20%	750
Set 5: K4 vs Set 8: k1a Planes	333	37.00%	23	2.56%	900
Set 5: K4 vs Set 9: k3 Planes	422	60.29%	275	39.29%	700
Set 5: K4 vs Set 10: K6 Planes	613	81.73%	95	12.67%	750
Set 5: K4 vs Set 11: K5 Planes	25	3.85%	244	37.54%	650
Set 7: k2 vs Set 8: k1a Planes	124	45.93%	7	2.59%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	53	23.56%	156	69.33%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	1	0.40%	68	26.98%	252
Set 8: k1a vs Set 10: K6 Planes	159	58.89%	109	40.37%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	14	6.67%	23	10.95%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	53	29.12%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	45	23.08%	195
User and Mean Set (Unweighted) Plane Intersections	7	33.33%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	7	33.33%	1	4.76%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	2	1.32%	151
Set 11: K5	1	7.69%	13

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	11	7.28%	151
Set 5: K4	6	12.00%	50
Set 10: K6	3	20.00%	15

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	772	6.82%	348	3.08%	11316
All Set Planes	601	7.29%	157	1.90%	8243
Set 4: K1b vs Set 5: K4 Planes	32	3.56%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	10	3.70%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	134	41.36%	0	0.00%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	117	50.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	31	3.44%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	31	11.48%	1	0.37%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	8	3.81%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	0	0.00%	225
Set 7: k2 vs Set 11: K5 Planes	27	13.85%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	148	58.73%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 8: k1a vs Set 11: K5 Planes	219	93.59%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	0	0.00%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	0	0.00%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	3	14.29%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	3	14.29%	1	4.76%	21

Dips Analysis Information

Project Summary

File Name: Stereo_Fossa.dips8
 Last saved with Dips version: 8.019
 Date Created: 22/12/2025, 11:06:58

General Settings

Data Format: Dip / Dip Direction
 Magnetic Declination (E pos): 0°
 Multiple Data Flag (Quantity): OFF
 Distance Column: OFF
 Extra Data Columns: 0
 Units: Metric
 Poles: 151
 Entries: 151

Traverses

No traverse information available.

Global Mean

	Dip	Dip Direction
Unweighted	30.73	18.67
Weighted	30.73	18.67

Global Best Fit

Unweighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Weighted			
	Dip	Dip Direction	Eigenvalue
S1	74.99	85.19	0.523068
S2	48.41	341.43	0.339719
S3	45.44	190.50	0.137214

Woodcock S1 / S3 = 3.812
 Woodcock K = 0.476
 Woodcock C = 1.338

Mean Set Planes

ID	Dip	Dip Direction	Label
4m	80.40	83.76	K1b
5m	49.58	56.12	K4
7m	56.20	276.50	k2
8m	75.93	261.66	k1a
9m	83.41	329.16	k3
10m	51.80	330.25	K6
11m	53.85	135.68	K5

Set Statistics

Set: 4m: K1b

Poles: 18
 Entries: 18
 Fisher's K: 142.684

	68.26%	95.44%	99.74%	50%
Variability Limit	7.27168°	11.9416°	16.6078°	5.64987°
Confidence Limit	1.71856°	2.81921°	3.91454°	1.3356°

Set: 5m: K4

Poles: 50
 Entries: 50
 Fisher's K: 15.6339

	68.26%	95.44%	99.74%	50%
Variability Limit	22.0897°	36.6314°	51.7369°	17.1251°
Confidence Limit	3.2072°	5.26206°	7.3082°	2.49243°

Set: 7m: k2

Poles: 15
 Entries: 15
 Fisher's K: 171.341

	68.26%	95.44%	99.74%	50%
Variability Limit	6.63503°	10.894°	15.1465°	5.15544°
Confidence Limit	1.71695°	2.81656°	3.91085°	1.33435°

Set: 8m: k1a

Poles: 18
 Entries: 18
 Fisher's K: 31.2764

	68.26%	95.44%	99.74%	50%
Variability Limit	15.569°	25.6742°	35.9344°	12.085°
Confidence Limit	3.71553°	6.09654°	8.46811°	2.88742°

Set: 9m: k3

Poles: 14
 Entries: 14
 Fisher's K: 174.549

	68.26%	95.44%	99.74%	50%
Variability Limit	6.57371°	10.7932°	15.0059°	5.10781°
Confidence Limit	1.76069°	2.88833°	4.01053°	1.36835°

Set: 10m: K6

Poles: 15

Entries: 15

Fisher's K: 47.5405

	68.26%	95.44%	99.74%	50%
Variability Limit	12.6147°	20.7641°	28.9791°	9.79598°
Confidence Limit	3.28336°	5.38708°	7.48195°	2.55161°

Set: 11m: K5

Poles: 13

Entries: 13

Fisher's K: 115.295

	68.26%	95.44%	99.74%	50%
Variability Limit	8.09072°	13.2903°	18.4909°	6.28584°
Confidence Limit	2.25127°	3.69326°	5.12852°	1.74959°

Set Windows

Set ID	Window	Type	Wrapped
4	4a	Curved	No
5	5a	Curved	No
7	7a	Curved	No
8	8a	Curved	No
9	9a	Curved	No
10	10a	Curved	No
11	11a	Curved	No

Intersections

Intersection Type	Number
Grid Data Planes	11316
All Set Planes	8243
Set 4: K1b vs Set 5: K4 Planes	900
Set 4: K1b vs Set 7: k2 Planes	270
Set 4: K1b vs Set 8: k1a Planes	324
Set 4: K1b vs Set 9: k3 Planes	252
Set 4: K1b vs Set 10: K6 Planes	270
Set 4: K1b vs Set 11: K5 Planes	234
Set 5: K4 vs Set 7: k2 Planes	750
Set 5: K4 vs Set 8: k1a Planes	900
Set 5: K4 vs Set 9: k3 Planes	700
Set 5: K4 vs Set 10: K6 Planes	750
Set 5: K4 vs Set 11: K5 Planes	650
Set 7: k2 vs Set 8: k1a Planes	270
Set 7: k2 vs Set 9: k3 Planes	210
Set 7: k2 vs Set 10: K6 Planes	225
Set 7: k2 vs Set 11: K5 Planes	195
Set 8: k1a vs Set 9: k3 Planes	252
Set 8: k1a vs Set 10: K6 Planes	270
Set 8: k1a vs Set 11: K5 Planes	234
Set 9: k3 vs Set 10: K6 Planes	210
Set 9: k3 vs Set 11: K5 Planes	182
Set 10: K6 vs Set 11: K5 Planes	195
User and Mean Set (Unweighted) Planes	21
User Planes	0
Mean Set (Unweighted) Planes	21

Kinematic Analysis

Slope Dip: 88
 Slope Dip Direction: 40
 Friction Angle: 28°
 Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	24	15.89%	151
Set 5: K4	22	44.00%	50

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	95	62.91%	151
Set 4: K1b	16	88.89%	18
Set 5: K4	49	98.00%	50
Set 9: k3	9	64.29%	14
Set 10: K6	15	100.00%	15
Set 11: K5	2	15.38%	13

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)

Critical 2 = Wedge Sliding (One Plane)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	3753	33.17%	2716	24.00%	11316
All Set Planes	2818	34.19%	1838	22.30%	8243
Set 4: K1b vs Set 5: K4 Planes	367	40.78%	287	31.89%	900
Set 4: K1b vs Set 7: k2 Planes	25	9.26%	34	12.59%	270
Set 4: K1b vs Set 8: k1a Planes	45	13.89%	27	8.33%	324
Set 4: K1b vs Set 9: k3 Planes	252	100.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	256	94.81%	14	5.19%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	123	16.40%	375	50.00%	750
Set 5: K4 vs Set 8: k1a Planes	169	18.78%	357	39.67%	900
Set 5: K4 vs Set 9: k3 Planes	563	80.43%	95	13.57%	700
Set 5: K4 vs Set 10: K6 Planes	554	73.87%	135	18.00%	750
Set 5: K4 vs Set 11: K5 Planes	134	20.62%	395	60.77%	650
Set 7: k2 vs Set 8: k1a Planes	85	31.48%	0	0.00%	270
Set 7: k2 vs Set 9: k3 Planes	0	0.00%	0	0.00%	210
Set 7: k2 vs Set 10: K6 Planes	53	23.56%	64	28.44%	225
Set 7: k2 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	1	0.40%	1	0.40%	252
Set 8: k1a vs Set 10: K6 Planes	159	58.89%	54	20.00%	270
Set 8: k1a vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	14	6.67%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	18	9.89%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	0	0.00%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	7	33.33%	3	14.29%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	7	33.33%	3	14.29%	21

Flexural Toppling

Flexural Toppling	Critical	%	Total
All Vectors	2	1.32%	151
Set 8: k1a	2	11.11%	18

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	26	17.22%	151
Set 5: K4	23	46.00%	50

Critical 1 = Direct Toppling (Intersection)

Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	405	3.58%	397	3.51%	11316
All Set Planes	209	2.54%	268	3.25%	8243
Set 4: K1b vs Set 5: K4 Planes	0	0.00%	0	0.00%	900
Set 4: K1b vs Set 7: k2 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 8: k1a Planes	0	0.00%	1	0.31%	324
Set 4: K1b vs Set 9: k3 Planes	0	0.00%	0	0.00%	252
Set 4: K1b vs Set 10: K6 Planes	0	0.00%	0	0.00%	270
Set 4: K1b vs Set 11: K5 Planes	0	0.00%	0	0.00%	234
Set 5: K4 vs Set 7: k2 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 8: k1a Planes	0	0.00%	0	0.00%	900
Set 5: K4 vs Set 9: k3 Planes	0	0.00%	0	0.00%	700
Set 5: K4 vs Set 10: K6 Planes	0	0.00%	0	0.00%	750
Set 5: K4 vs Set 11: K5 Planes	0	0.00%	0	0.00%	650
Set 7: k2 vs Set 8: k1a Planes	0	0.00%	3	1.11%	270
Set 7: k2 vs Set 9: k3 Planes	11	5.24%	8	3.81%	210
Set 7: k2 vs Set 10: K6 Planes	0	0.00%	2	0.89%	225
Set 7: k2 vs Set 11: K5 Planes	168	86.15%	0	0.00%	195
Set 8: k1a vs Set 9: k3 Planes	0	0.00%	242	96.03%	252
Set 8: k1a vs Set 10: K6 Planes	0	0.00%	12	4.44%	270
Set 8: k1a vs Set 11: K5 Planes	4	1.71%	0	0.00%	234
Set 9: k3 vs Set 10: K6 Planes	15	7.14%	0	0.00%	210
Set 9: k3 vs Set 11: K5 Planes	5	2.75%	0	0.00%	182
Set 10: K6 vs Set 11: K5 Planes	6	3.08%	0	0.00%	195
User and Mean Set (Unweighted) Plane Intersections	1	4.76%	1	4.76%	21
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	1	4.76%	1	4.76%	21