

**E45 - SISTEMAZIONE STRADALE DEL NODO DI PERUGIA
Tratto Madonna del Piano - Collestrada**

PROGETTO DEFINITIVO

PG 372

ANAS - DIREZIONE TECNICA

<p>IL GEOLOGO</p>  <p>Dott. Geol. <i>Marco Leonardini</i> Ordine Geologi n. 1541 Regione Lazio n. 1541</p>	<p>I PROGETTISTI SPECIALISTICI</p> <p><i>Ing. Ambrogio Signorelli</i> Ordine Ingegneri Provincia di Roma n. A35111</p>	<p>PROGETTAZIONE ATI: (Mandataria)</p> <p>GP INGENGNERIA <i>GESTIONE PROGETTI INGENGNERIA srl</i></p> <p>(Mandante)</p> <p> cooprogetti</p> <p>(Mandante)</p> <p> engeko</p> <p>(Mandante)</p> <p> Studio di Architettura e Ingegneria Moderna</p>
<p>COORDINATORE PER LA SICUREZZA IN FASE DI PROGETTAZIONE</p> <p><i>Arch. Santo Salvatore Vermiglio</i> Ordine Architetti Provincia di Reggio Calabria n. 1270</p>	<p><i>Ing. Moreno Panfili</i> Ordine Ingegneri Provincia di Perugia n. A2657</p> <p><i>Ing. Giovanni C. Alfredo Dalenz Cultrera</i> Ordine Ingegneri Provincia di Roma n. 14069</p>	<p>IL PROGETTISTA RESPONSABILE DELL'INTEGRAZIONE DELLE PRESTAZIONI SPECIALISTICHE. (DPR207/10 ART 15 COMMA 12):</p> <p><i>Dott. Ing. GIORGIO GUIDUCCI</i> Ordine Ingegneri Provincia di Roma n. 14035</p> 
<p>VISTO: IL RESP. DEL PROCEDIMENTO</p> <p><i>Ing. Alessandro Micheli</i></p>	<p><i>Ing. Giuseppe Resta</i> Ordine Ingegneri Provincia di Roma n. 20629</p>	
<p>VISTO: IL RESP. DEL PROGETTO</p> <p><i>Arch. Pianif. Marco Colazza</i></p>		

STUDI ED INDAGINI
Geologia e geotecnica
Indagini geognostiche
Monitoraggio inclinometrico e piezometrico

CODICE PROGETTO			NOME FILE	REVISIONE	SCALA
PROGETTO	LIV.PROG.	ANNO	T00GE00GEORE03_A		
DTPG372	D	22	CODICE ELAB. T00GE00GEORE03	A	-
D					
C					
B					
A	Emissione		Ottobre'22	Barletta	Leonardi
REV.	DESCRIZIONE		DATA	REDATTO	VERIFICATO
					APPROVATO

LETTURE INCLINOMETRICHE DI CONTROLLO IN AMBITO DI PROGETTO DEFINITIVO

PROGETTAZIONE DEFINITIVA E 45 - SISTEMAZIONE STRADALE DEL NODO DI PERUGIA
TRATTO MADONNA DEL PIANO - COLLESTRADA (PG) PRESTAZIONE DI SERVIZI RELATIVI
AD INDAGINI GEOGNOSTICHE E MONITORAGGIO GEOTECNICO PER LA PROGETTAZIONE
DEFINITIVA RIFERITA ALL'ACCORDO QUADRO DG28/17



settembre 2022

Report relativo ai tubi inclinometrici

MISURA DI ESERCIZIO N 3-S17in



CARATTERISTICHE STRUMENTAZIONE DI MISURA



DIGITAL MEMS
INCLINOMETER SYSTEMS

INCLINOMETERS
& PENDULUMS



Caratteristiche della strumentazione utilizzata

**inclinometers
& pendulums**

**SERVO-INCLINOMETER
PROBES**

INCLINOMETER SYSTEM PERFORMANCES (with ARCHIMEDE datalogger)

Readout value:	20.000 sin alpha	It is the amplified value of angle that can be read on the digital readout unit, expressed in sin alpha
Repeatability:	0.01%FS	It is the difference between two or more repeated readings taken at the same inclination
Reading resolution:	± 0.05mm x 500mm (for probe with measuring range of ± 30 dg)	It is the smallest increment in angle resolution change that can be read on the readout display as 1 digit
Sensor orientation:	0.5 dg	It is the maximum azimuthal rotation between the probe wheels and sensitive axis of the sensor. Differences in rotation introduce systematic error declared in the calibration sheet. The value of 0.5° introduces a negligible error that doesn't require any data correction
Total accuracy	± 4.00 mm x 30 m	It is the system accuracy attainable during the measurements in field. It is expressed as lateral deviation over a length of 30 m of casing, correctly installed (vertical deviation within 3°)

TECHNICAL SPECIFICATIONS

INCLINOMETER PROBES	Model 0S242SV3000	Model 0S241SH3000
Applications	(sub)vertical casings	horizontal casing
Sensor	Force balance servo-accelerometer	
Measuring range	±30°(± 15°, ±90°optional)	±30°(±15°optional)
Sensitive axis	one or two	one
Electric output signal	± 5 V at full scale	± 1 V at full scale
Excitation voltage	from ±12.5 to ±15 V DC	+ 5 to 15 V DC
Non-linearity + hysteresis	0.02% FS (for ±90°probe: 0.06% FS)	0.02% FS
Repeatability	0.01%FS (for ±90°probe: 0.02% FS)	0.01%FS
Temp. operating range	from -20°C to +70°C	from -20°C to +70°C
Temp. compensated range	from 0°C to +50°C	from 0°C to +50°C
Material	stainless steel	stainless steel
Diameter	28 mm	42 mm
Length (without connector)	750 mm	790 mm
Wheel carriage	pair of wheels mounted on long-life sealed ball bearings	
Wheel diameter	32 mm	32 mm
Distance between wheel axis	500 mm (metric), 2 feet (English)	
Weight	2.0 kg	4.0 kg



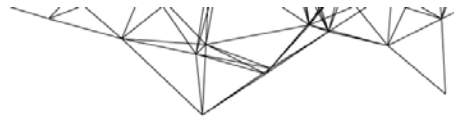
CE electromagnetic compatibility according to EN 61326-1 and EN 61326-A1 directives for EMC emission and immunity

INCLINOMETER CABLE (PRODUCT CODE OWE306KE000)



Inclinometer cable is used to position the probe in the casing. It has 6 electrical leads – 18 AWG - conducting power and signal. The external yellow polyurethane jacket with copper crimped depth marks resists abrasions and chemicals. A stainless steel shield moulded within the external jacket reduces cable twisting and a stainless steel core wire controls stretching. An internal binder sheath eliminates slipping of the single conductors relative to the external cable jacket. Cable is supplied in specified lengths graduated every 500 mm (metric) and every 2 feet (English), wrapped on a portable cable reel with the connector of probe attached at factory. Probe connector is stainless steel made watertight up to 20 bar.

Cable lengths	30,50,60,100,150,200 m 100',200',300',400',500' (English)
Graduation	500 mm (metric), 2-foot (English)
Layout	6 conductors 18 AWG
Depth tactile marks	every 500 mm (2 feet English)
Stress member	steel core, diam. 2.5 mm
Max strength	500 kg
Outer jacket	yellow colour polyurethane
Overall diameter	nominal 12 mm



ARCHIMEDE READOUT

ARCHIMEDE is a rugged, portable readout designed for inclinometer applications. It features a large, daylight-readable display that can display inclinometer graphs. Other features include a rugged, water resistant case and a convenient hand-switch for one-man surveys. The Archimedes connects by cable for reliable field operations. SISGEO's SMART Manager Suite for Windows, included with the readout, is used to manage the Archimede and provides a way to update its firmware and software.

TECHNICAL SPECIFICATIONS

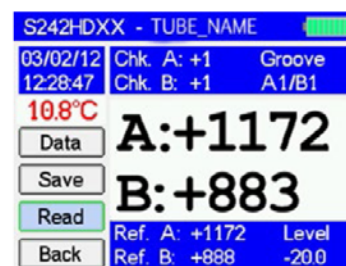
	OCDL300INCL	CE
A/D converter	2 x 24 bit, with autocalibration	
Storage memory	2 GB	
Resolution	100 μ V with FS \pm 5 V 100 μ V with FS \pm 12 V	
Accuracy	0.01 % FS	
Input impedance	>10 M Ω for voltage <2.5 V	
LCD color graphic display	5.7" (320 x 240 pixel), sunlight reliable	
Communication with pc/notebook	USB 2.0, 1.0 Mbit / sec	
Communication with digital probe	RS485 modbus	
Temperature operating range	-20°C +60 °C	
Case	Crushproof ABS, IP67	
Dimensions and weight	200 x 280 x 75mm (LxWxH), 2 kg	
Probe power supply	24 V for digital MEMS probes \pm 2.5 V for spiral probe	
Battery	12V - 4.5 Ah, Ni-MH	
Operating time	approx. 8 hours	



SURVEY AND PLOT



Archimede can display high-resolution plots when the survey is finished.

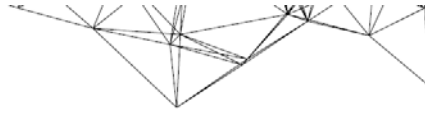


At each reading interval, Archimede displays depth, A and B readings, and checksums. Reference (zero) readings and temperature are also displayed.

INCLINOMETER CABLES



Back bag cable 0S2SB600000



S200D

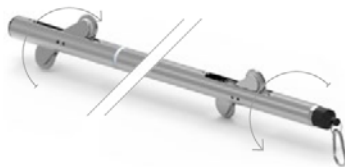
Inclinometer cables are used to control the depth of the probe and transmit readings from the probe to the readout. The HD (Heavy Duty) and Light cables are supplied on reels and include a factory-attached connector for the probe. The back bag cable is supplied without reel and has factory-attached connectors at both ends. Probe-end connectors are watertight to 20 bar.

	HD CABLE 0S2RC600000	LIGHT CABLE 0S2RD600000	BACK BAG CABLE 0S2SB600000
	It has a stainless steel core wire to control stretching and a stainless steel torsion braid to prevent twisting. Yellow cable jacket has copper depth marks. Available with both simple reel or slip-ring reel (0S2RCS000000).	Light cable has a Kevlar stress member for strength. For digital sensors only. Orange cable jacket has aluminum depth marks. Supplied on reel.	It is the same as light cable, but has connectors attached at both ends. Orange cable has aluminum depth marks. Supplied with back bag, without reel.
Cable lengths	30,50,60,100,150,200 m	30,50,60,100,150,200 m	30,50,70,100 m
Conductors	6x0.50 mm ²	2x0.50 + 2x0.22 mm ²	2x0.50 + 2x0.22 mm ²
Depth tactile marks	copper, every 500 mm	aluminum, every 500 mm	aluminum, every 500 mm
Stress member	steel core	kevlar fiber	kevlar fiber
Max strength	500 kg	300 kg	300 kg
Outer jacket	yellow, polyurethane	orange, polyurethane	orange, polyurethane
Cable diameter	10.4 mm	5.7 mm	5.7 mm
Weight (cable+marks)	0,150 kg/m	0,072 kg/m	0,072 kg/m
Total weight with 50 m cable	12 kg with reel	4.50 kg with reel	3.80 kg no reel

SPIRAL PROBE

The Spiral probe is used to measure twist in installed inclinometer casing (tubes). The measurements can be used for correcting readings taken from twisted casing. SISGEO recommends that spiral surveys be taken at the same time as the initial inclinometer readings. The spiral probe is compatible with the Archimede readout and HD inclinometer cable. It is not compatible with light cable or no-reel cable.

KLION software is required to process spiral data and apply corrections to inclinometer readings.



Spiral probe: twisting on the probe axis for measuring the inclinometer casing torsion

	0S30PR12000
Type of sensor	rotary contactless potentiometer (magneto-resistive)
Measuring range	±5 degrees over the wheel base (1 meter)
Resolution	± 0.01°
Accuracy	< 0.5% FS
Output signal	± 200 mV at FS
Power supply	± 2.5 V DC
Connector	watertight, 6 pins compatible with heavy-duty cable
Body diameter	28 mm
Length	1250 mm (without connector)
Gauge length (distance between wheels)	1000 mm

Sito di misura e relativi dati

SITO: COLLESTRADA VOC. S. MARTA

NOTE RELATIVE ALLA CAMPAGNA DI MISURA

tubo	data di misura	note
S17In	14/04/2022	nessuna nota
S17In	28/04/2022	nessuna nota
S17In	27/05/2022	nessuna nota
S17In	26/09/2022	nessuna nota

Tubi rilevati e riportati nel presente rapporto

Identificativo tubo Incl. S17	Data misura di zero 14/04/2022
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TUBO : S17 In

Località: Collestrada Voc. s. Marta

Coordinata X (GB)	: 2.298.618
Coordinata Y (GB)	: 4.770.057
Quota testa tubo [m slm]	: 234,00
Altezza pozzetto da testa tubo [m]	: +0.00
Altezza pozzetto da p.c. [m]	: +0.00
Profondità progetto [m]	: 34,5
Profondità prima misura [m]	: 34,5
Azimut guida 1-3 (°)	: 10
Data misura spiralometrica [gg/mm/aa]	: 14/04/2022
Data misura di zero [gg/mm/aa]	: 14/04/2022
Sonda misura di zero	: S160073
Sonda spiralometrica	: S30PR120

Tubo inclinometrico	n°	Date misure di esercizio
S17In	1	28/04/2022
	2	27/05/2022
	3	26/09/2022

TUBO INCLINOMETRICO S17In

letture di campagna

lettura es. n° 3

quota (m slm)	prof. (m)	Letture guide Tubo S17 In							
		A1	B1	A2	B2	A3	B3	A4	B4
234,0	0,00								
233,5	0,50	-75	31	26	82	79	-36	-22	-73
233,0	1,00	-124	0	-8	131	131	2	12	-120
232,5	1,50	-192	-15	-21	195	198	26	26	-194
232,0	2,00	-234	-25	-18	241	240	25	25	-223
231,5	2,50	-246	-70	-69	253	250	73	74	-240
231,0	3,00	-283	-100	-98	293	286	104	105	-285
230,5	3,50	-304	-107	-101	316	312	104	109	-306
230,0	4,00	-310	-65	-60	320	315	63	66	-308
229,5	4,50	-313	-8	-3	321	318	12	8	-308
229,0	5,00	-279	-31	-27	294	283	35	36	-282
228,5	5,50	-261	-10	-3	271	265	7	8	-260
228,0	6,00	-308	4	13	323	312	-4	-6	-305
227,5	6,50	-336	4	10	345	339	-3	-5	-338
227,0	7,00	-323	-3	6	330	325	0	1	-321
226,5	7,50	-272	-13	-5	275	272	7	10	-263
226,0	8,00	-330	-108	-126	317	337	128	133	-320
225,5	8,50	-305	-120	-126	305	314	135	129	-307
225,0	9,00	-266	-93	-94	265	273	106	101	-264
224,5	9,50	-276	-65	-63	276	281	72	68	-275
224,0	10,00	-237	-46	-46	239	244	55	48	-238
223,5	10,50	-225	-38	-42	222	228	44	42	-217
223,0	11,00	-174	-46	-50	186	176	49	54	-175
222,5	11,50	-213	-25	-24	211	218	33	31	-217
222,0	12,00	-289	-39	-39	289	294	46	44	-286
221,5	12,50	-381	-83	-83	383	386	93	85	-383
221,0	13,00	-481	-133	-137	477	485	150	142	-474
220,5	13,50	-588	-206	-161	537	547	175	165	-541
220,0	14,00	-296	-293	-275	316	300	285	284	-304
219,5	14,50	-207	-243	-236	218	211	237	241	-204
219,0	15,00	-203	-171	-166	214	207	165	170	-207
218,5	15,50	-213	-86	-79	222	219	79	79	-216
218,0	16,00	-236	-23	-14	248	243	14	12	-239
217,5	16,50	-269	-11	-6	278	272	13	8	-266
217,0	17,00	-322	-178	-171	336	328	176	176	-322
216,5	17,50	-334	-217	-208	347	336	219	215	-332
216,0	18,00	-364	-201	-189	375	369	196	195	-360
215,5	18,50	-369	-185	-181	377	370	187	187	-364
215,0	19,00	-346	-183	-176	350	346	185	181	-342
214,5	19,50	-302	-175	-167	306	302	170	172	-293
214,0	20,00	-376	-160	-174	365	379	173	179	-362
213,5	20,50	-390	-142	-144	393	397	156	148	-397
213,0	21,00	-367	-149	-152	371	370	161	157	-364
212,5	21,50	-342	-129	-133	342	348	142	134	-344
212,0	22,00	-330	-99	-102	326	332	109	106	-331
211,5	22,50	-317	-77	-79	316	324	87	86	-318
211,0	23,00	-280	-161	-165	300	284	158	174	-282
210,5	23,50	-284	-171	-171	295	292	176	181	-279
210,0	24,00	-296	-127	-128	303	300	132	134	-289
209,5	24,50	-333	-162	-155	340	338	159	164	-327
209,0	25,00	-288	-152	-149	299	298	147	154	-284
208,5	25,50	-311	-180	-178	315	313	179	186	-305
208,0	26,00	-275	-108	-98	265	279	121	102	-264
207,5	26,50	-282	-81	-76	278	285	84	80	-282
207,0	27,00	-314	-124	-115	312	315	127	116	-312
206,5	27,50	-352	-154	-158	352	356	168	160	-353
206,0	28,00	-384	-182	-186	383	391	198	191	-387

205,5	28,50	-400	-183	-181	401	407	193	186	-403
205,0	29,00	-366	-190	-208	382	368	197	216	-387
204,5	29,50	-363	-154	-156	367	368	163	165	-373
204,0	30,00	-342	-159	-164	344	348	166	170	-350
203,5	30,50	-329	-146	-150	332	334	155	158	-339
203,0	31,00	-304	-110	-113	306	308	122	119	-310
202,5	31,50	-261	-54	-57	264	262	66	63	-268
202,0	32,00	-243	-166	-151	269	249	162	152	-243
201,5	32,50	-315	-150	-138	325	316	145	145	-319
201,0	33,00	-383	-92	-82	396	390	89	88	-375
200,5	33,50	-388	-119	-121	395	391	115	128	-392
200,0	34,00	-300	-157	-153	308	303	163	156	-299
199,5	34,50	-220	-158	-151	232	228	151	157	-222
S17		xGB = 2.298.618 y=4.770.057		Az G1 350 (10)		Quota 234,00 m			
		lettura tre del 26/09/2022		altezza pozzetto 0 cm		TD 34,5 m			

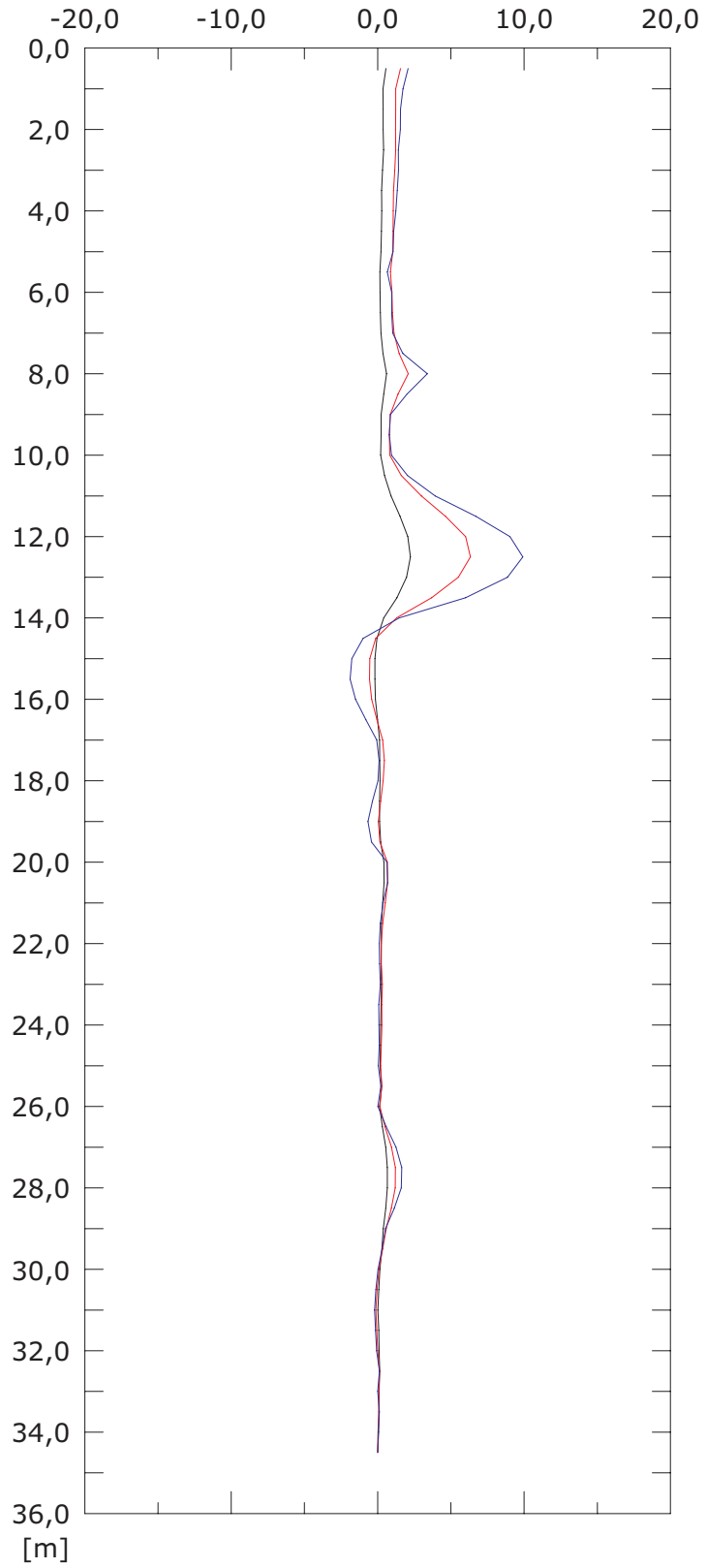
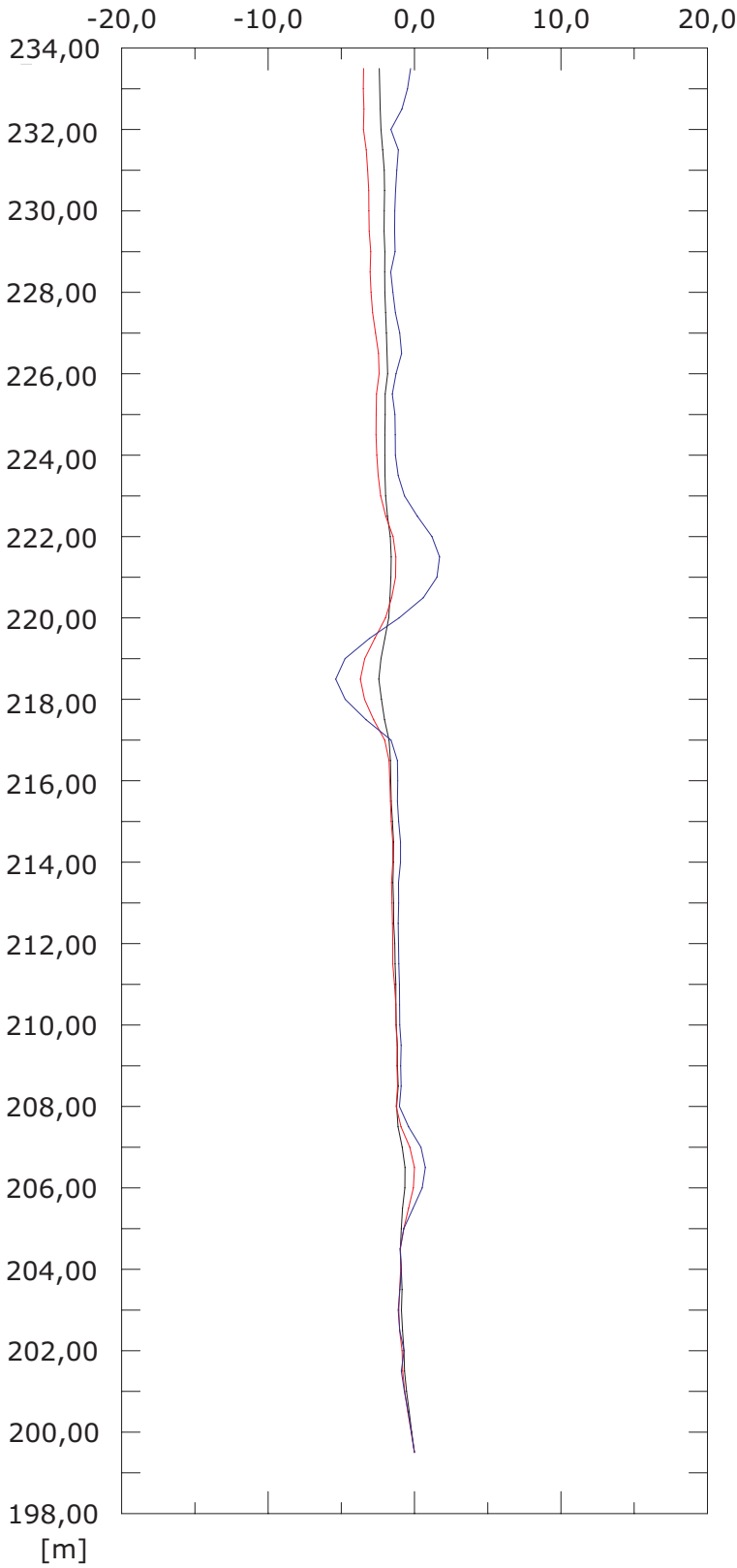
TUBO INCLINOMETRICO S17In elaborati grafici e numerici

Elaborazione differenziale integrale dal basso

Riferimento 000:14/04/2022

Spost. EST [mm]

Spost. NORD [mm]



001:28/04/2022

002:27/05/2022

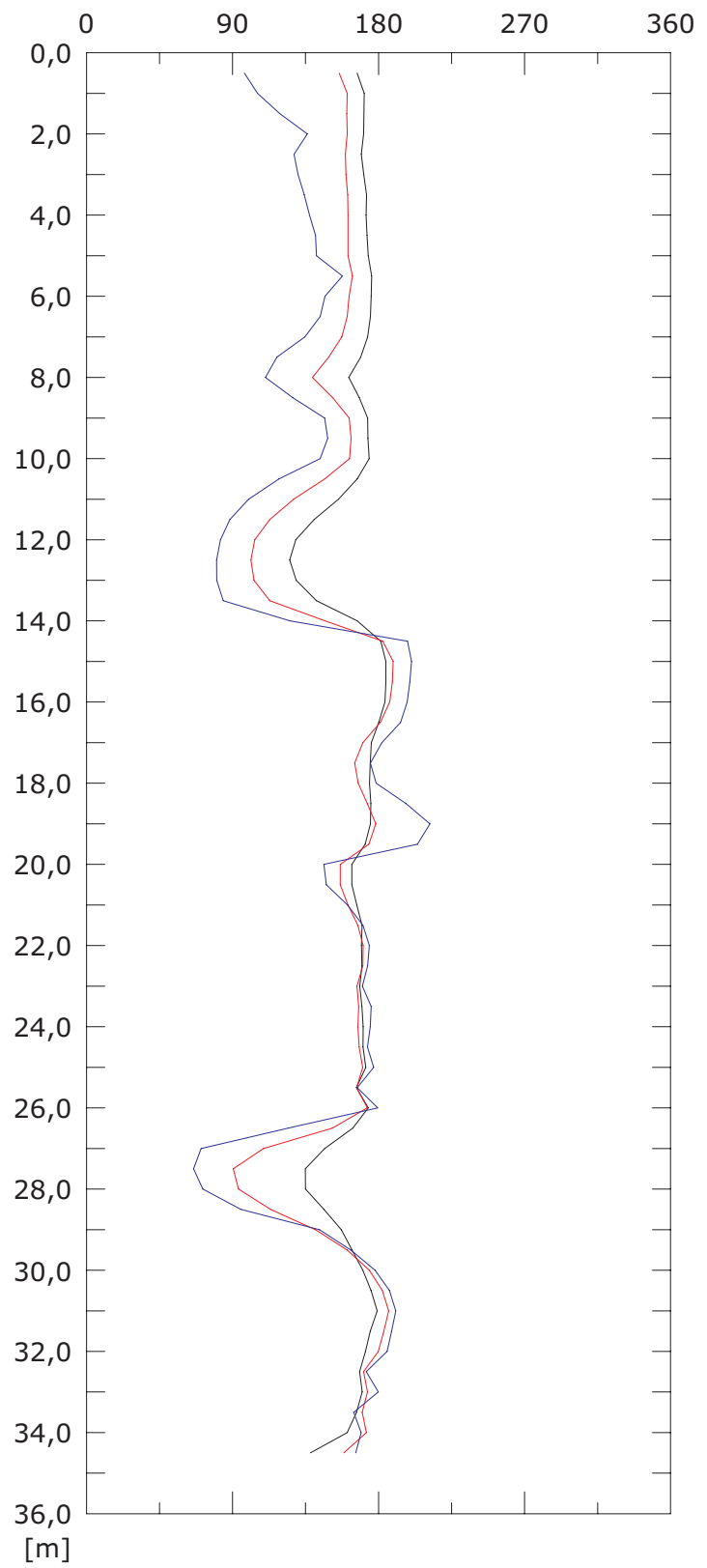
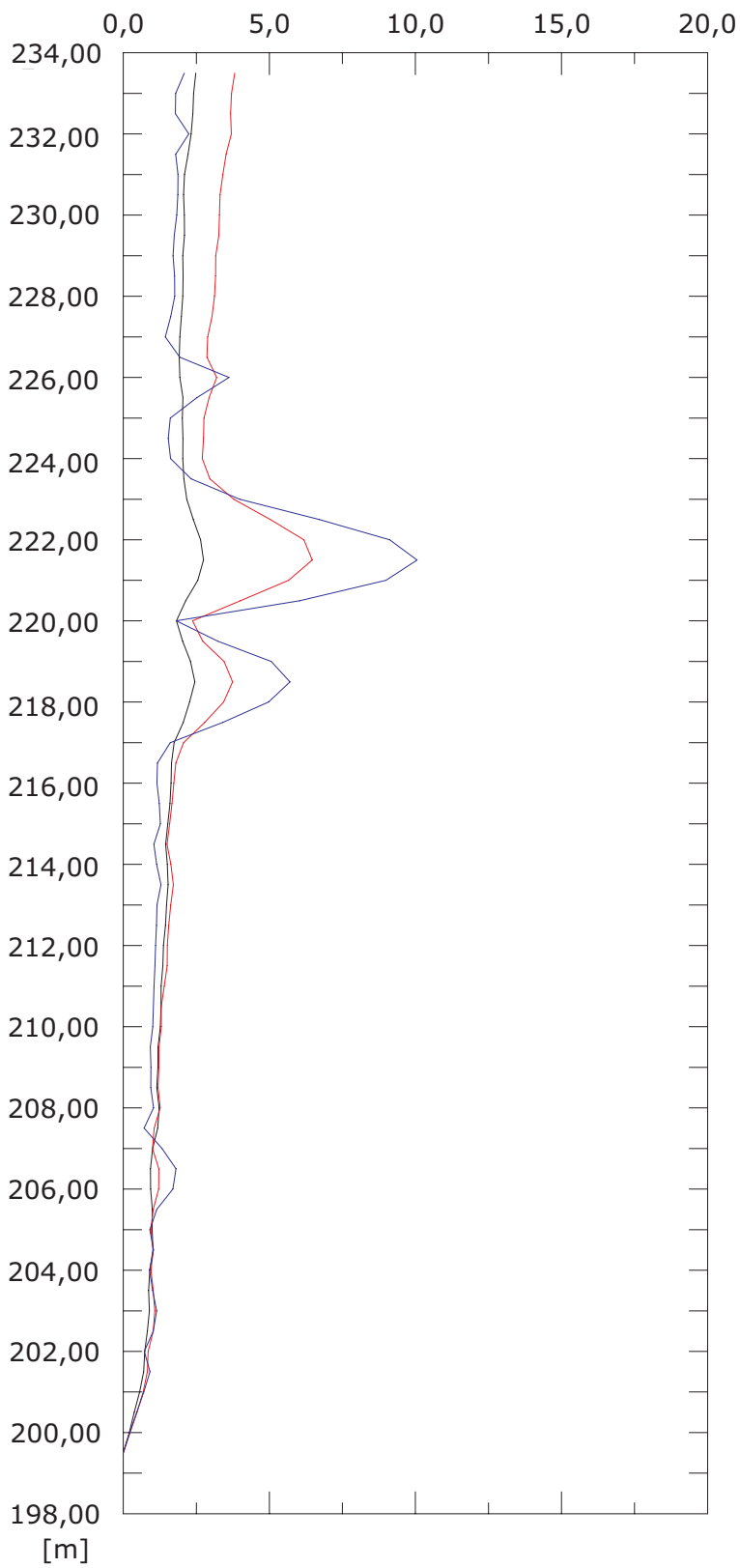
003:26/09/2022

Elaborazione differenziale integrale dal basso

Riferimento 000:14/04/2022

Risultante spost. [mm]

Angolo [gradi]



001:28/04/2022

002:27/05/2022

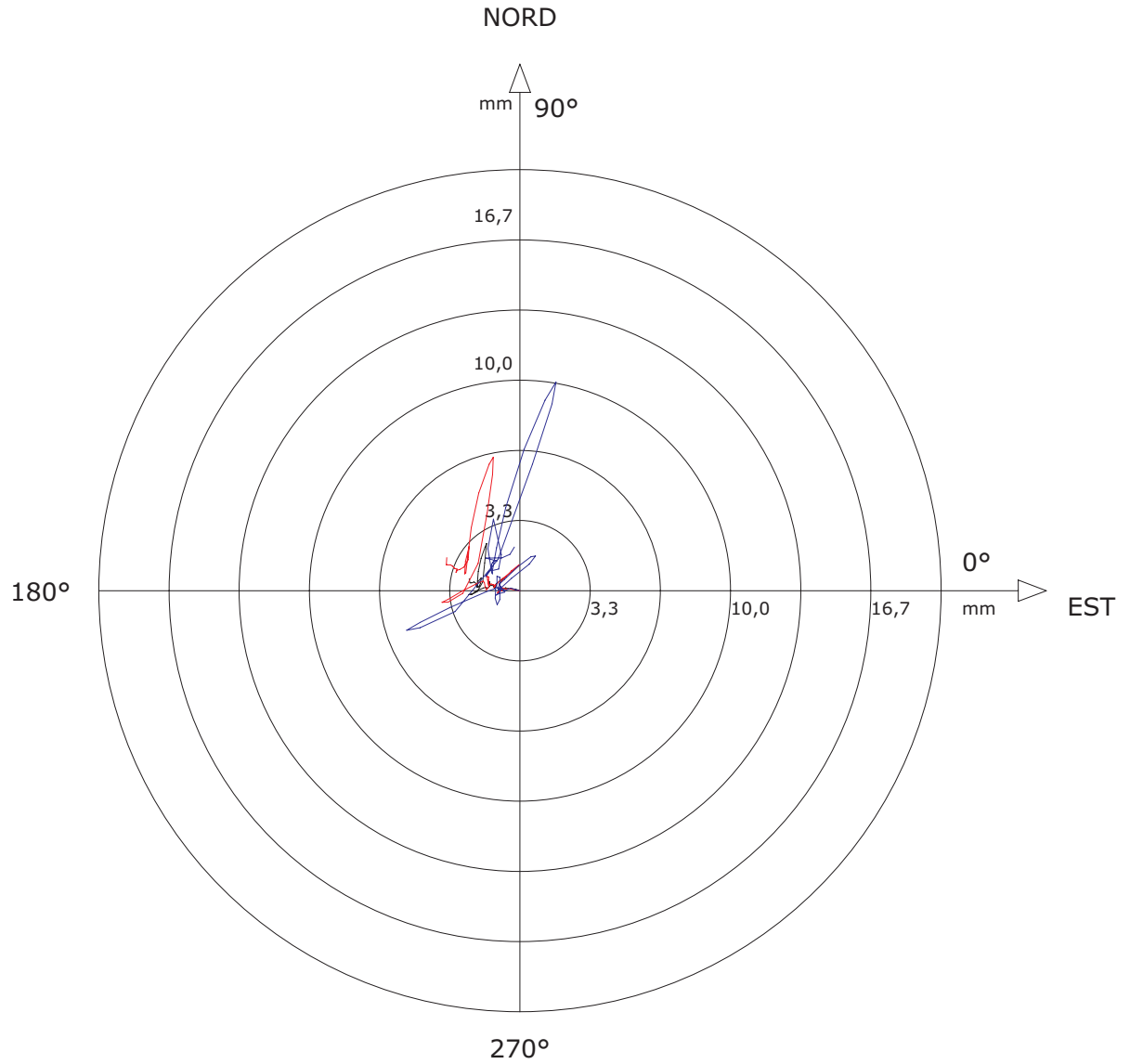
003:26/09/2022

Sito: COLLESTRADA Tubo: S17in

Elaborazione differenziale integrale dal basso

Riferimento 000:14/04/2022

Diagramma polare della deviazione



001:28/04/2022

002:27/05/2022

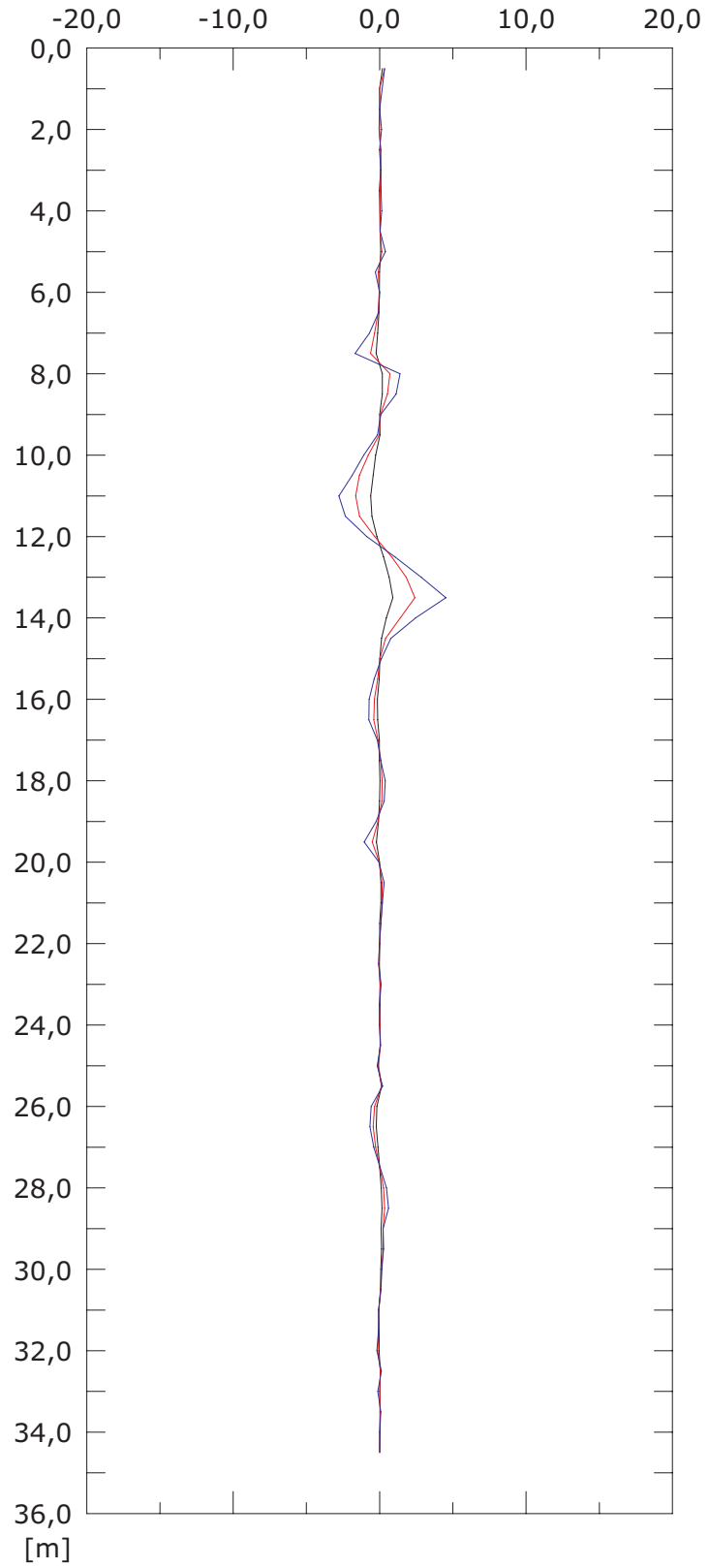
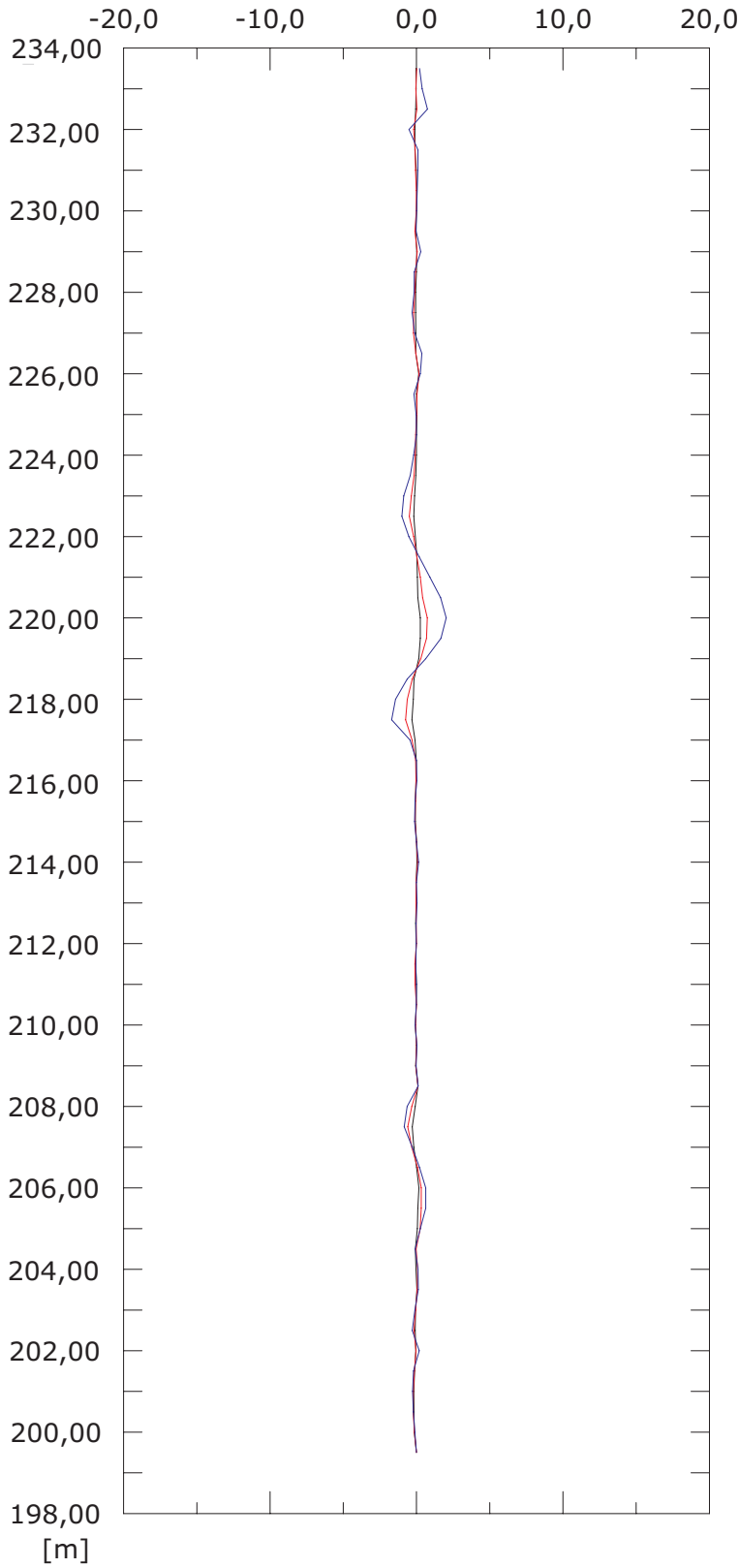
003:26/09/2022

Elaborazione differenziale locale dal basso

Riferimento 000:14/04/2022

Spost. EST [mm]

Spost. NORD [mm]



001:28/04/2022

002:27/05/2022

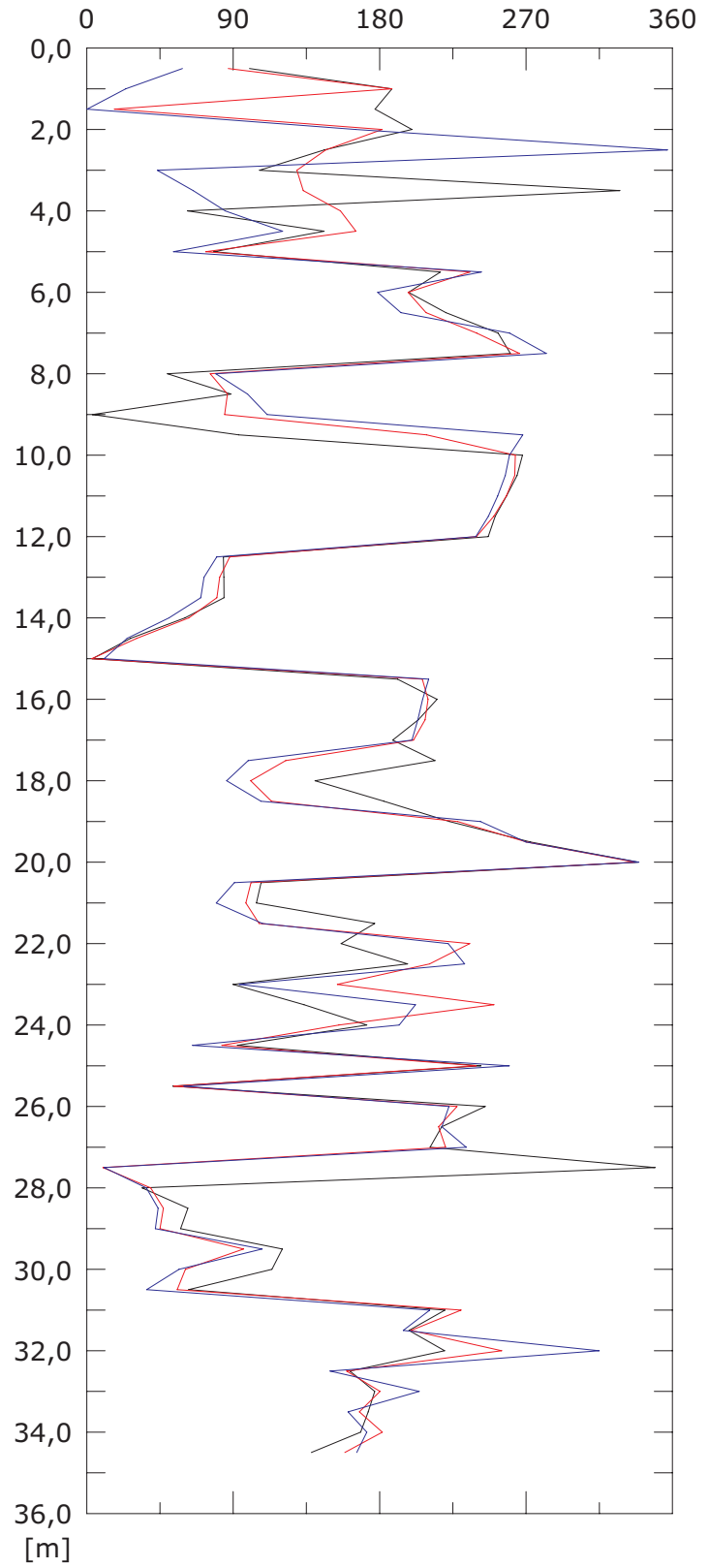
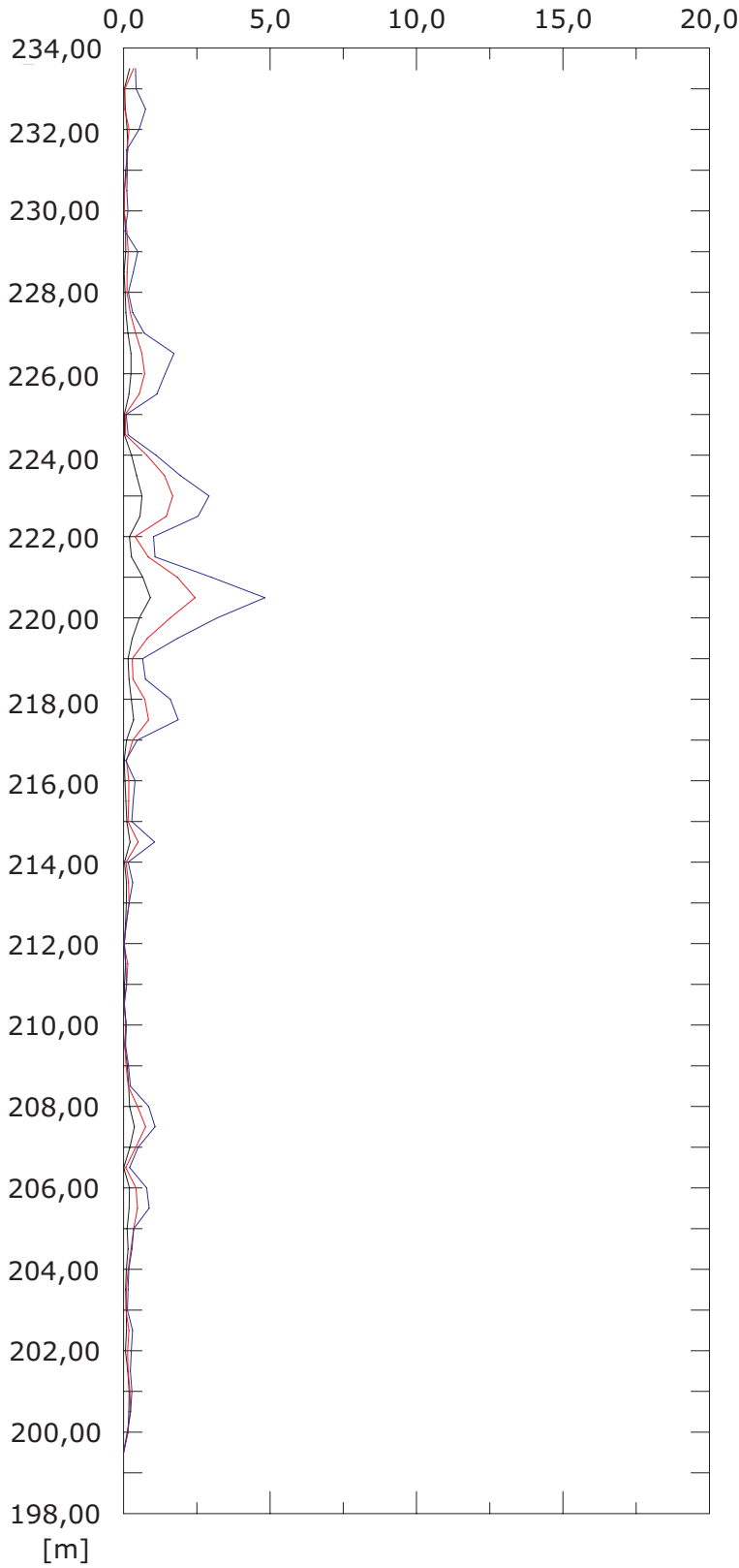
003:26/09/2022

Elaborazione differenziale locale dal basso

Riferimento 000:14/04/2022

Risultante spost. [mm]

Angolo [gradi]



001:28/04/2022

002:27/05/2022

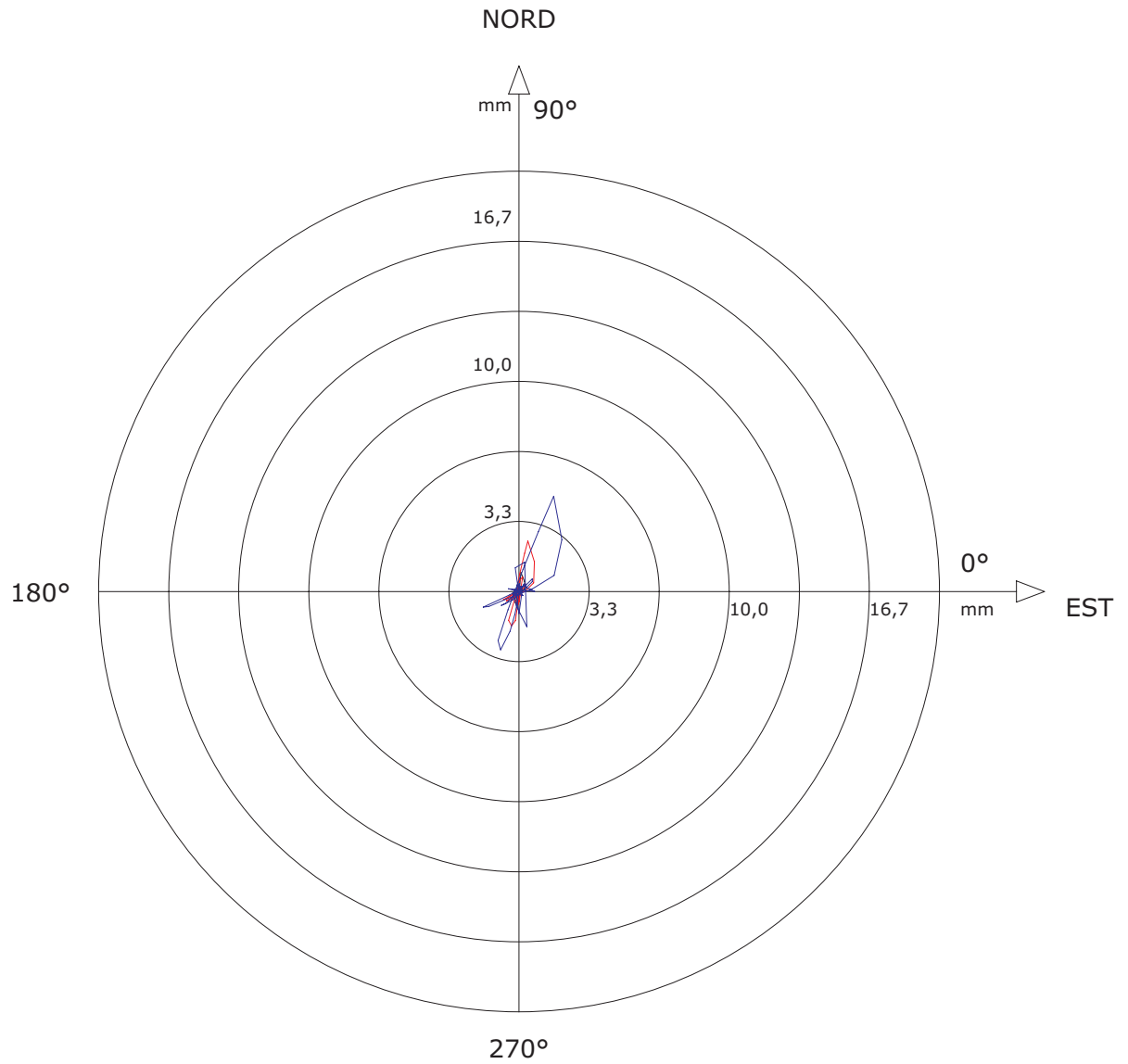
003:26/09/2022

Sito: COLLESTRADA Tubo: S17in

Elaborazione differenziale locale dal basso

Riferimento 000:14/04/2022

Diagramma polare della deviazione



— 001:28/04/2022

— 002:27/05/2022

— 003:26/09/2022

Sito : COLLESTRAD

Tubo inclin. : S17in

N.ro Misura : 003

Data Misura : 26/09/2022

Località : Collestrada

Scostamenti dalla misura N. 000 - Elaborazione dal basso

Metri	Scost.locali Dir. EST [mm]	Scost.locali Dir. NORD [mm]	Scost.integr. Dir. EST [mm]	Scost.integr. Dir. NORD [mm]	Val.integr. Risultante [mm]	Val.integr. Azimut [gradi]
0,5	0,21	0,34	-0,27	2,07	2,09	97,33
1,0	0,39	0,17	-0,47	1,73	1,79	105,37
1,5	0,75	0,00	-0,87	1,55	1,78	119,14
2,0	-0,51	0,13	-1,61	1,55	2,24	136,15
2,5	0,11	-0,01	-1,10	1,42	1,80	127,91
3,0	0,09	0,09	-1,21	1,42	1,87	130,36
3,5	0,05	0,10	-1,30	1,34	1,86	134,21
4,0	0,01	0,14	-1,35	1,24	1,83	137,42
4,5	-0,02	0,04	-1,36	1,09	1,74	141,18
5,0	0,29	0,39	-1,34	1,05	1,70	141,72
5,5	-0,15	-0,29	-1,62	0,67	1,76	157,71
6,0	-0,16	0,00	-1,47	0,96	1,76	146,99
6,5	-0,30	-0,07	-1,31	0,95	1,62	143,93
7,0	-0,12	-0,69	-1,01	1,02	1,44	134,60
7,5	0,37	-1,68	-0,89	1,71	1,93	117,36
8,0	0,26	1,39	-1,26	3,39	3,62	110,33
8,5	-0,18	1,12	-1,52	2,00	2,52	127,16
9,0	-0,03	0,08	-1,34	0,88	1,61	146,78
9,5	-0,01	-0,15	-1,31	0,80	1,54	148,66
10,0	-0,20	-1,09	-1,31	0,95	1,62	144,06
10,5	-0,43	-1,89	-1,11	2,04	2,32	118,61
11,0	-0,87	-2,78	-0,68	3,93	3,99	99,87
11,5	-1,00	-2,33	0,19	6,70	6,71	88,37
12,0	-0,52	-0,87	1,19	9,04	9,12	82,50
12,5	0,19	1,05	1,71	9,91	10,06	80,21
13,0	0,92	2,85	1,52	8,86	8,99	80,25
13,5	1,65	4,53	0,60	6,01	6,04	84,28
14,0	2,03	2,47	-1,05	1,48	1,81	125,31

Sito : COLLESTRAD

Tubo inclin. : S17in

N.ro Misura : 003

Data Misura : 26/09/2022

Località : Collestrada

Scostamenti dalla misura N. 000 - Elaborazione dal basso

Metri	Scost.locali Dir. EST [mm]	Scost.locali Dir. NORTH [mm]	Scost.integr. Dir. EST [mm]	Scost.integr. Dir. NORTH [mm]	Val.integr. Risultante [mm]	Val.integr. Azimut [gradi]
14,5	1,67	0,77	-3,08	-0,99	3,24	197,83
15,0	0,63	0,12	-4,75	-1,76	5,07	200,34
15,5	-0,64	-0,37	-5,38	-1,88	5,70	199,26
16,0	-1,43	-0,71	-4,74	-1,51	4,97	197,64
16,5	-1,71	-0,74	-3,31	-0,80	3,40	193,55
17,0	-0,44	-0,16	-1,60	-0,06	1,61	182,04
17,5	-0,01	0,07	-1,16	0,10	1,17	174,96
18,0	0,03	0,39	-1,15	0,03	1,15	178,55
18,5	-0,10	0,31	-1,18	-0,36	1,23	196,86
19,0	-0,13	-0,24	-1,08	-0,67	1,27	211,62
19,5	0,00	-1,06	-0,95	-0,42	1,04	203,94
20,0	0,14	-0,05	-0,95	0,63	1,14	146,29
20,5	0,00	0,31	-1,09	0,69	1,29	147,80
21,0	0,03	0,19	-1,09	0,38	1,15	160,91
21,5	-0,03	0,08	-1,12	0,19	1,14	170,42
22,0	-0,02	-0,02	-1,09	0,11	1,10	174,34
22,5	-0,04	-0,06	-1,07	0,13	1,08	173,32
23,0	-0,01	0,10	-1,03	0,18	1,05	170,03
23,5	-0,02	-0,01	-1,03	0,08	1,03	175,40
24,0	-0,09	-0,02	-1,01	0,09	1,01	174,86
24,5	0,03	0,06	-0,92	0,11	0,92	173,19
25,0	-0,03	-0,16	-0,94	0,05	0,95	177,04
25,5	0,12	0,20	-0,91	0,21	0,94	166,96
26,0	-0,63	-0,58	-1,03	0,01	1,03	179,44
26,5	-0,84	-0,66	-0,40	0,59	0,71	124,30
27,0	-0,29	-0,39	0,44	1,25	1,33	70,67
27,5	0,20	0,04	0,73	1,65	1,80	65,98
28,0	0,63	0,47	0,53	1,61	1,70	71,72

Sito : COLLESTRAD

Tubo inclin. : S17in

N.ro Misura : 003

Data Misura : 26/09/2022

Località : Collestrada

Scostamenti dalla misura N. 000 - Elaborazione dal basso

Metri	Scost.locali	Scost.locali	Scost.integr.	Scost.integr.	Val.integr.	Val.integr.
	Dir. EST [mm]	Dir. NORD [mm]	Dir. EST [mm]	Dir. NORD [mm]	Risultante [mm]	Azimut [gradi]
28,5	0,63	0,60	-0,10	1,14	1,14	95,04
29,0	0,26	0,23	-0,73	0,54	0,91	143,65
29,5	-0,09	0,27	-0,99	0,30	1,03	162,87
30,0	0,10	0,15	-0,90	0,03	0,90	177,85
30,5	0,12	0,09	-1,00	-0,12	1,01	186,70
31,0	-0,11	-0,07	-1,12	-0,21	1,14	190,58
31,5	-0,29	-0,08	-1,01	-0,14	1,02	188,04
32,0	0,19	-0,19	-0,72	-0,07	0,72	185,30
32,5	-0,20	0,12	-0,90	0,12	0,91	172,39
33,0	-0,26	-0,12	-0,70	0,00	0,70	179,85
33,5	-0,22	0,08	-0,44	0,12	0,46	164,73
34,0	-0,12	0,02	-0,22	0,04	0,22	169,19
34,5	0,00	0,00	0,00	0,00	0,00	0,00

Sito : COLLESTRAD

Tubo inclin. : S17in

N.ro Misura : 003

Data Misura : 26/09/2022

Località : Collestrada

Scostamenti dalla misura N. 000 - Dati statistici

	Scost.locali Dir. EST [mm]	Scost.locali Dir. NORD [mm]	Scost.integr. Dir. EST [mm]	Scost.integr. Dir. NORD [mm]	Val.integr. Risultante [mm]	Val.integr. Azimut [gradi]
Min	-1,71	-2,78	-5,38	-1,88	0,10	65,98
Max	2,03	4,53	1,71	9,91	10,06	211,62
Media	0,00	0,03	-1,03	1,12	2,12	148,54
V. Q. M.	0,33	0,97	2,41	6,21	8,62	23482,07
Varianza	0,33	0,97	1,36	4,96	4,11	22055,53
Dev. Std.	0,57	0,98	1,17	2,23	2,03	148,51

