



Cerreto d'Esì il 24 ottobre 2010  
Comm.: Dr. Geol. Stefano Taffoni  
Cant.: Via Dari-Via Paolini-S. Benedetto del T. (AP)  
Indagine HVSR - N°: 1 del: 21/10/2010

**Comm: Dr. Geol Stefano Taffoni - Cant.: Via Dari-Via Paolini-S.Benedetto del T.(AP)**

Instrument: TEP-0040/01-09

Start recording: 21/10/10 17:05:40 End recording: 21/10/10 17:19:41

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN



GPS location: 013°53.0021 E, 42°57.2050 N (9.4 m )

UTC time (synchronized to the first recording sample): not available in this acquisition mode + 0 samples

Satellite no.: 04

Trace length: 0h14'00". Analyzed 95% trace (manual window selection)

Sampling frequency: 128 Hz

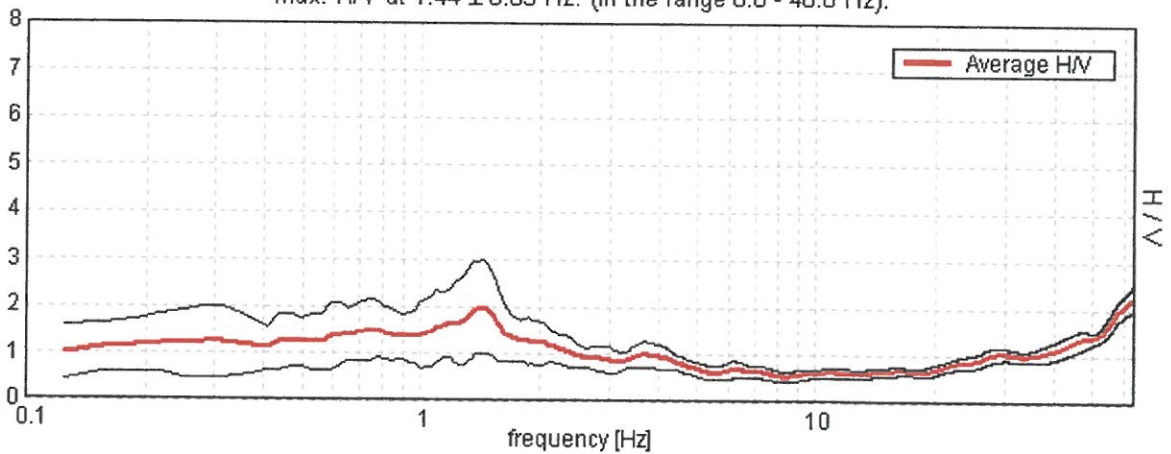
Window size: 20 s

Smoothing window: Triangular window

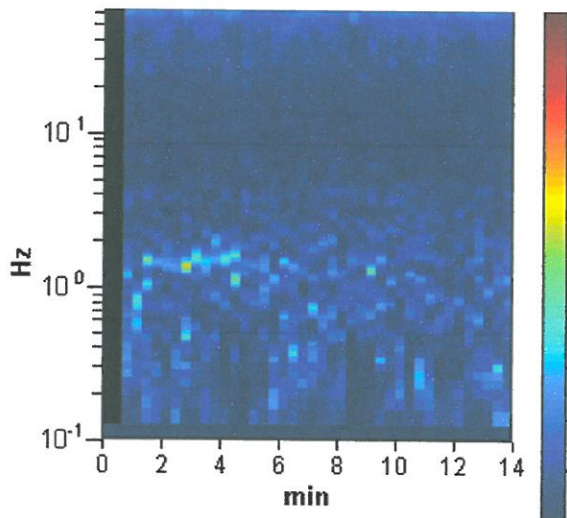
Smoothing: 10%

**HORIZONTAL TO VERTICAL SPECTRAL RATIO**

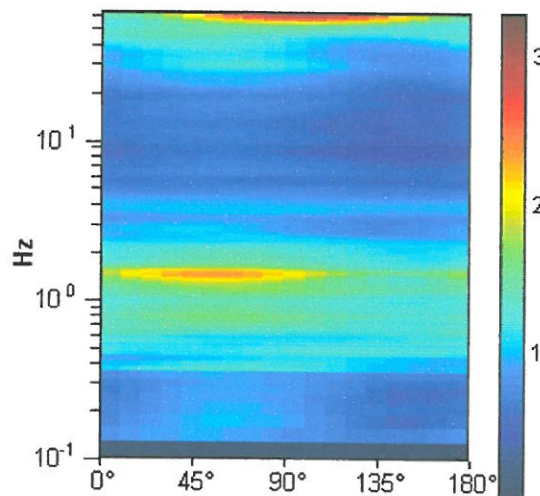
Max. H/V at 1.44 ± 0.05 Hz. (In the range 0.0 - 40.0 Hz).



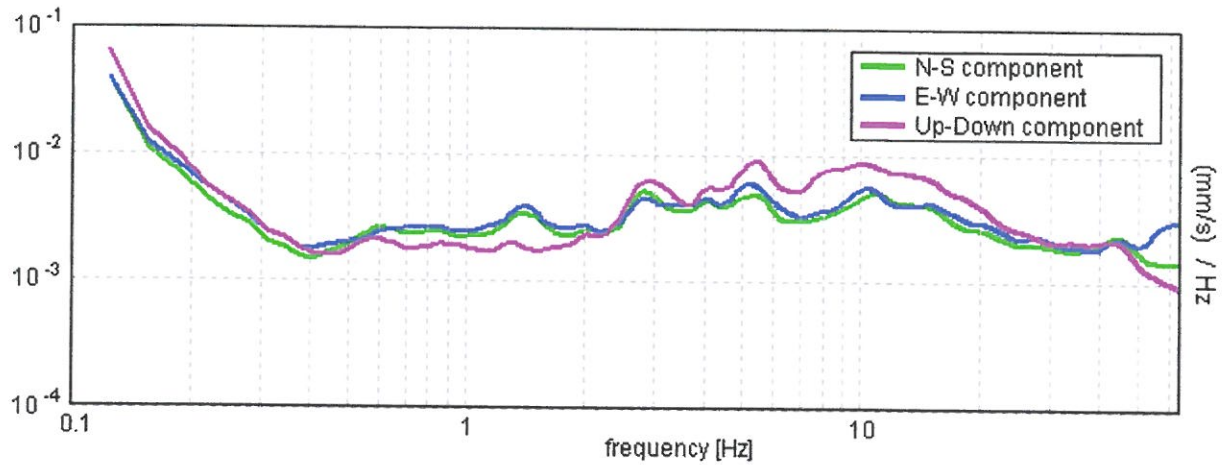
**H/V TIME HISTORY**



**DIRECTIONAL H/V**

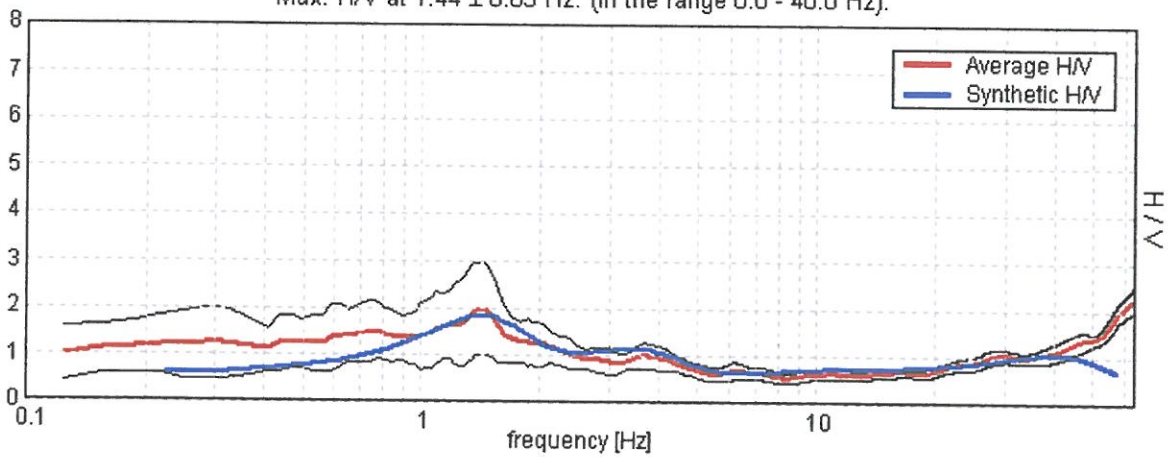


### SINGLE COMPONENT SPECTRA



### EXPERIMENTAL VS. SYNTHETIC H/V

Max. H/V at  $1.44 \pm 0.05$  Hz. (In the range 0.0 - 40.0 Hz).



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
0.50	0.50	90	0.35
3.50	3.00	150	0.35
9.50	6.00	180	0.35
13.50	4.00	200	0.35
38.50	25.00	300	0.35
58.50	20.00	340	0.35
inf.	inf.	480	0.36

Vs(0.0-30.0)=224m/s

[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.44 ± 0.05 Hz (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.44 > 0.50	OK	
$n_c(f_0) > 200$	1150.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 70 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$			<b>NO</b>
Exists $f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	2.438 Hz	OK	
$A_0 > 2$	1.98 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01719  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02471 < 0.14375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.4845 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

**Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$**

Freq.range [Hz]	< 0.2	0.2 - 0.5	0.5 - 1.0	1.0 - 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20