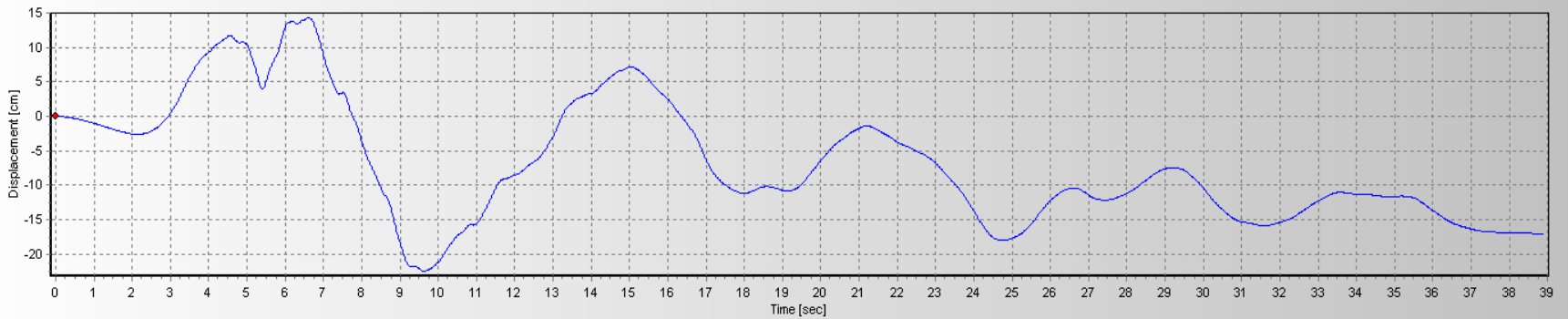
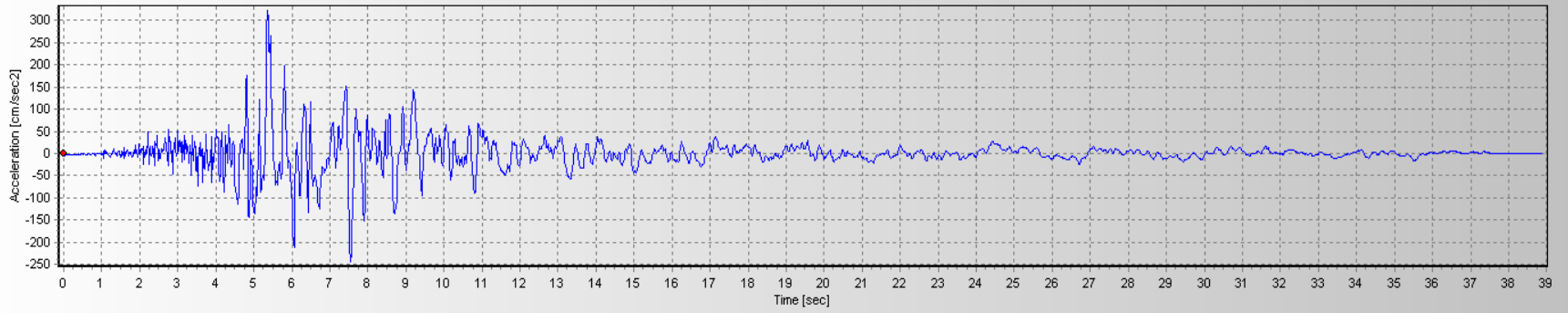
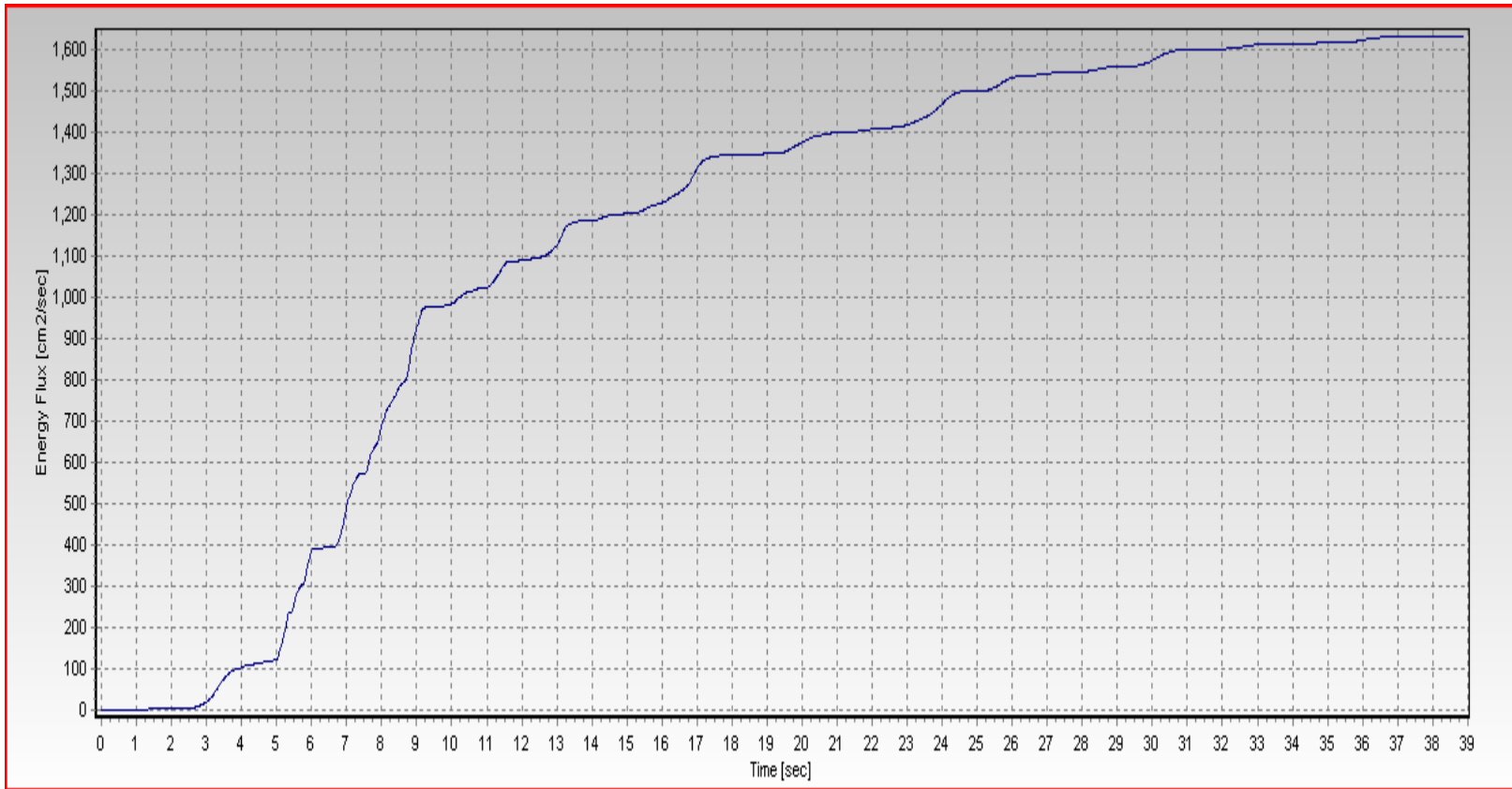


MATCH PO176L TO DEFINED NGA SPECTRUM

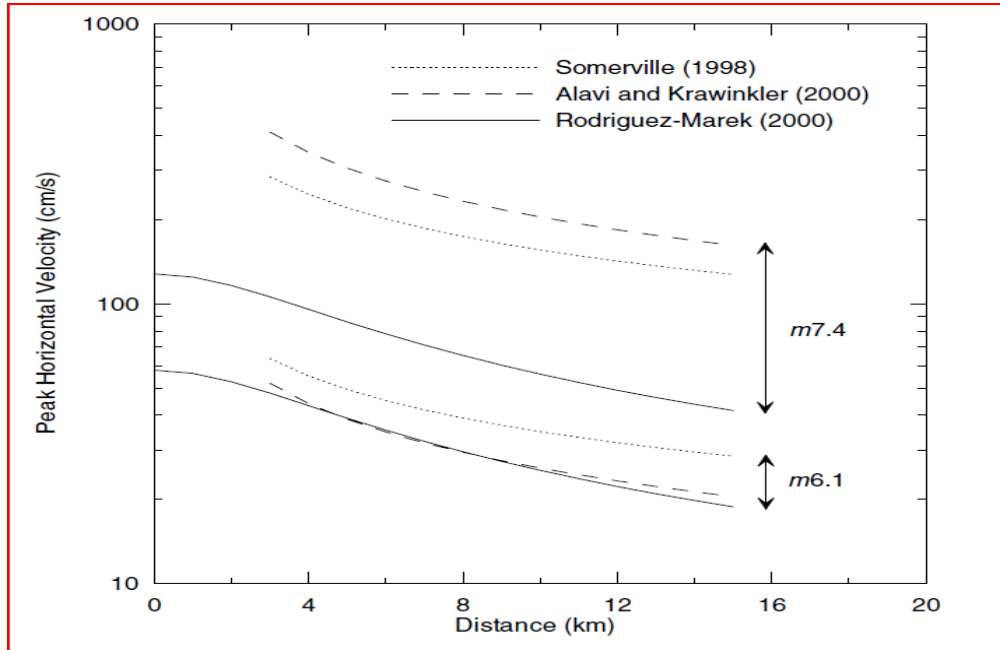


MATCHED PO176L COMPONENT



ENERGY FLUX FOR MATCHED NON PULSE LIKE COMPONENT PO176L

$$\log T_P = -2.9 + 0.5M_w$$



$$\ln(\text{PHV}) = a + b m + c \ln(r^2 + d^2)$$

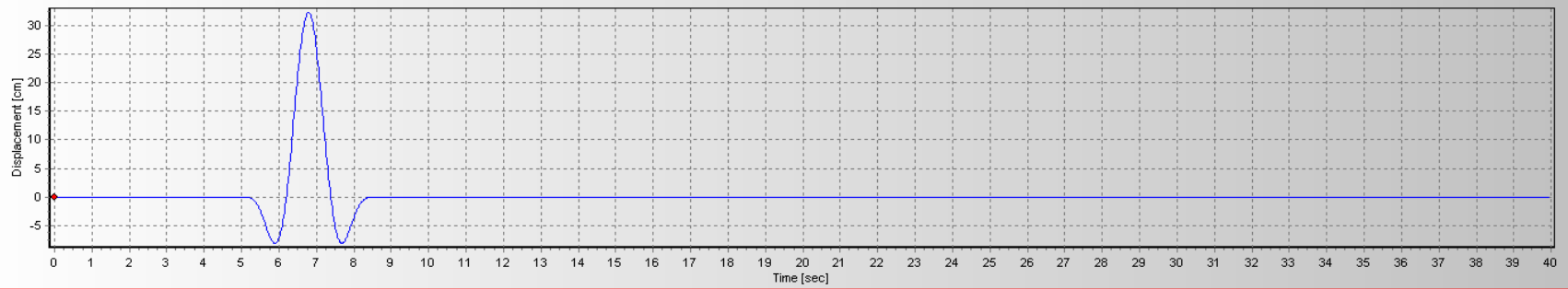
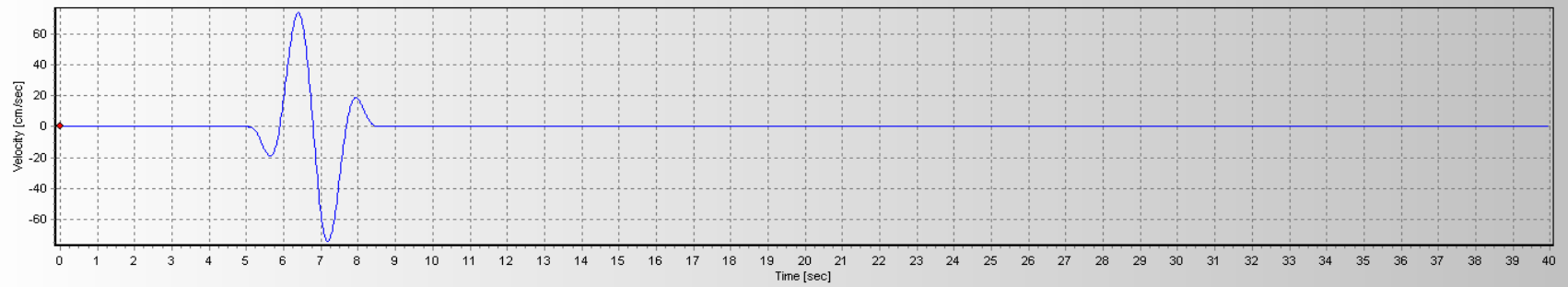
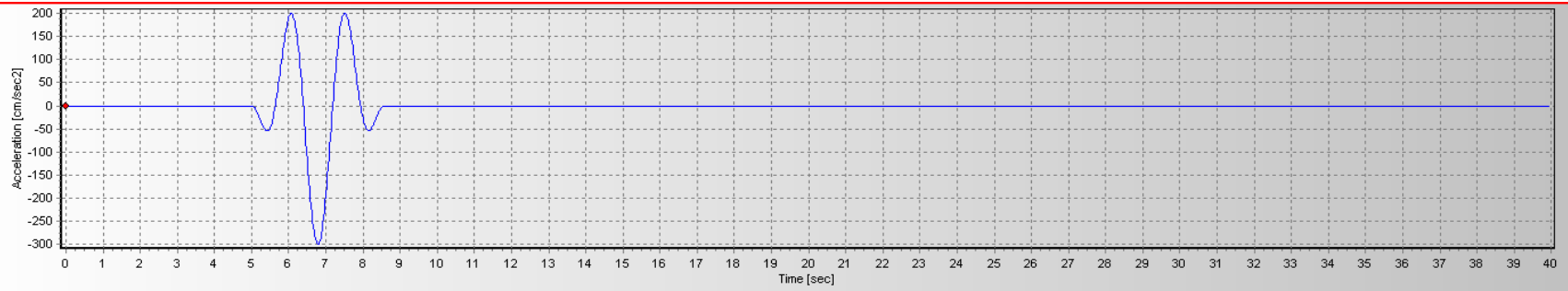
| Data Set | a | b | c | d |
|-------------|------|------|-------|------|
| All Motions | 2.44 | 0.50 | -0.41 | 3.93 |
| Rock | 1.46 | 0.61 | -0.38 | 3.93 |
| Soil | 3.86 | 0.30 | -0.42 | 3.93 |

$$\bar{a}(\bar{t}) = \frac{a(t)}{Af_P} = \begin{cases} -\frac{\pi}{\gamma} \left[\sin\left(\frac{\bar{t}}{\gamma}\right) \cos(\bar{t} + v) + \gamma \sin(\bar{t} + v) \left(1 + \cos\left(\frac{\bar{t}}{\gamma}\right)\right) \right], & -\pi\gamma \leq \bar{t} \leq \pi\gamma \text{ with } \gamma > 1, \\ 0, & \text{otherwise} \end{cases}$$

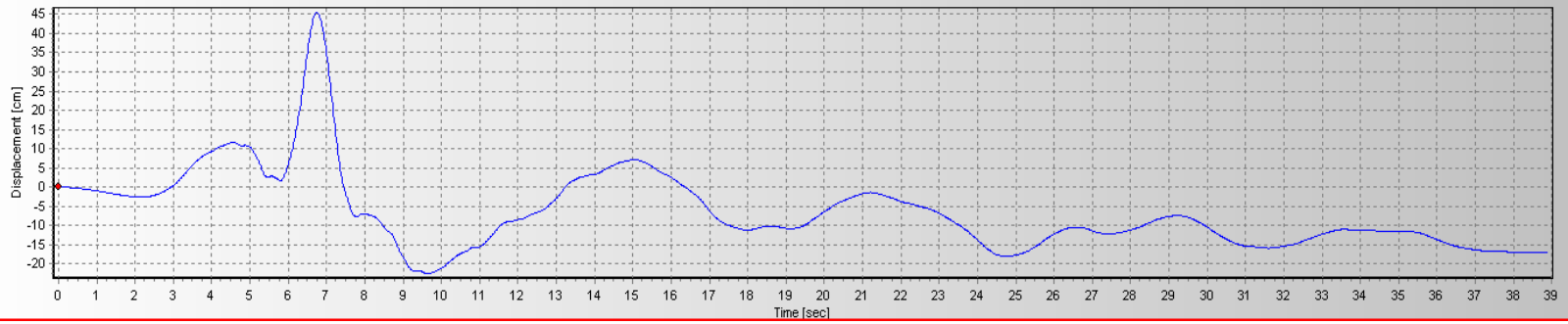
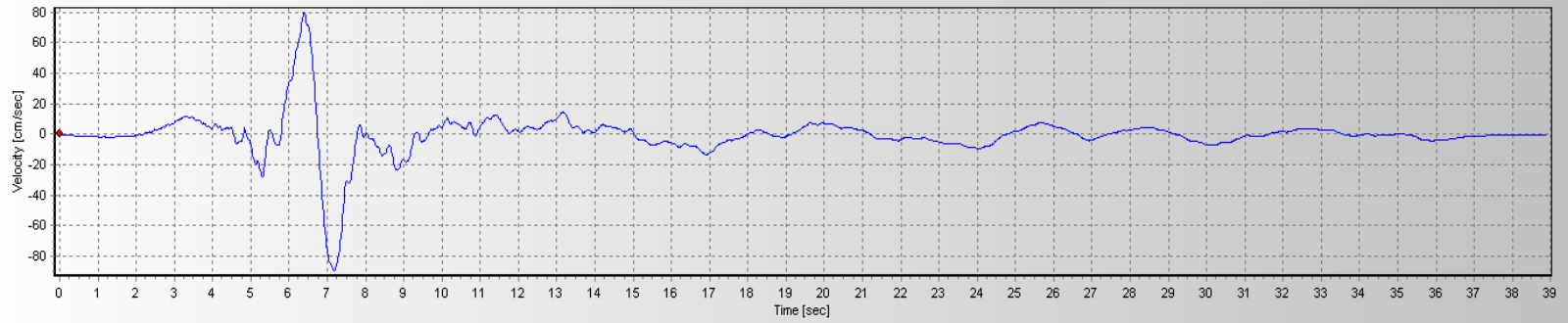
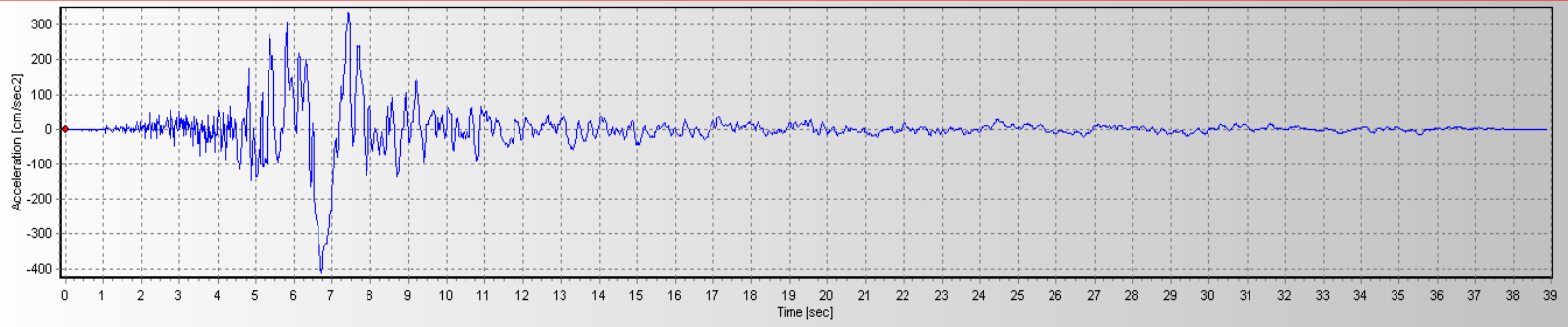
$$\bar{v}(\bar{t}) = \frac{v(\bar{t})}{A} = \begin{cases} \frac{1}{2} \left[1 + \cos\left(\frac{\bar{t}}{\gamma}\right) \right] \cos(\bar{t} + v), & -\pi\gamma \leq \bar{t} \leq \pi\gamma \text{ with } \gamma > 1, \\ 0, & \text{otherwise} \end{cases}$$

$$\bar{d}(\bar{t}) = \frac{d(t)}{(Af_P)} = \begin{cases} \frac{1}{4\pi} \left[\sin(\bar{t} + v) + \frac{1}{2} \frac{\gamma}{\gamma - 1} \sin\left(\frac{\gamma - 1}{\gamma} \bar{t} + v\right) + \frac{1}{2} \frac{\gamma}{\gamma + 1} \sin\left(\frac{\gamma + 1}{\gamma} \bar{t} + v\right) \right], & -\pi\gamma \leq \bar{t} \leq \pi\gamma \\ \frac{1}{4\pi} \frac{1}{(1 - \gamma^2)} \sin(v - \pi\gamma), & \bar{t} < -\pi\gamma \\ \frac{1}{4\pi} \frac{1}{(1 - \gamma^2)} \sin(v + \pi\gamma), & \bar{t} > \pi\gamma \end{cases} \quad \gamma > 1 .$$

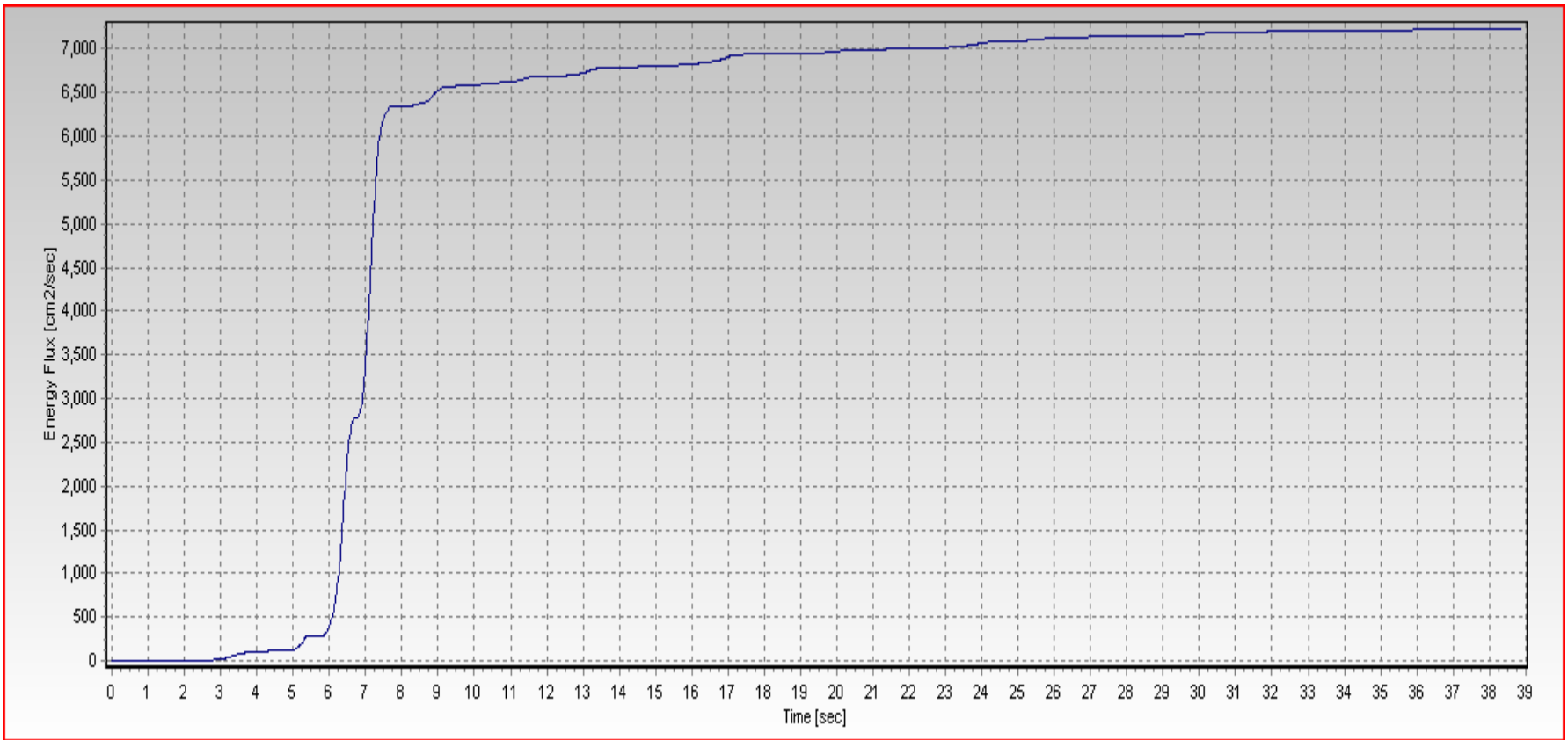
A=85 cm/sec , f=0.56 Hz, $\gamma=2$, $v=90$ degrees



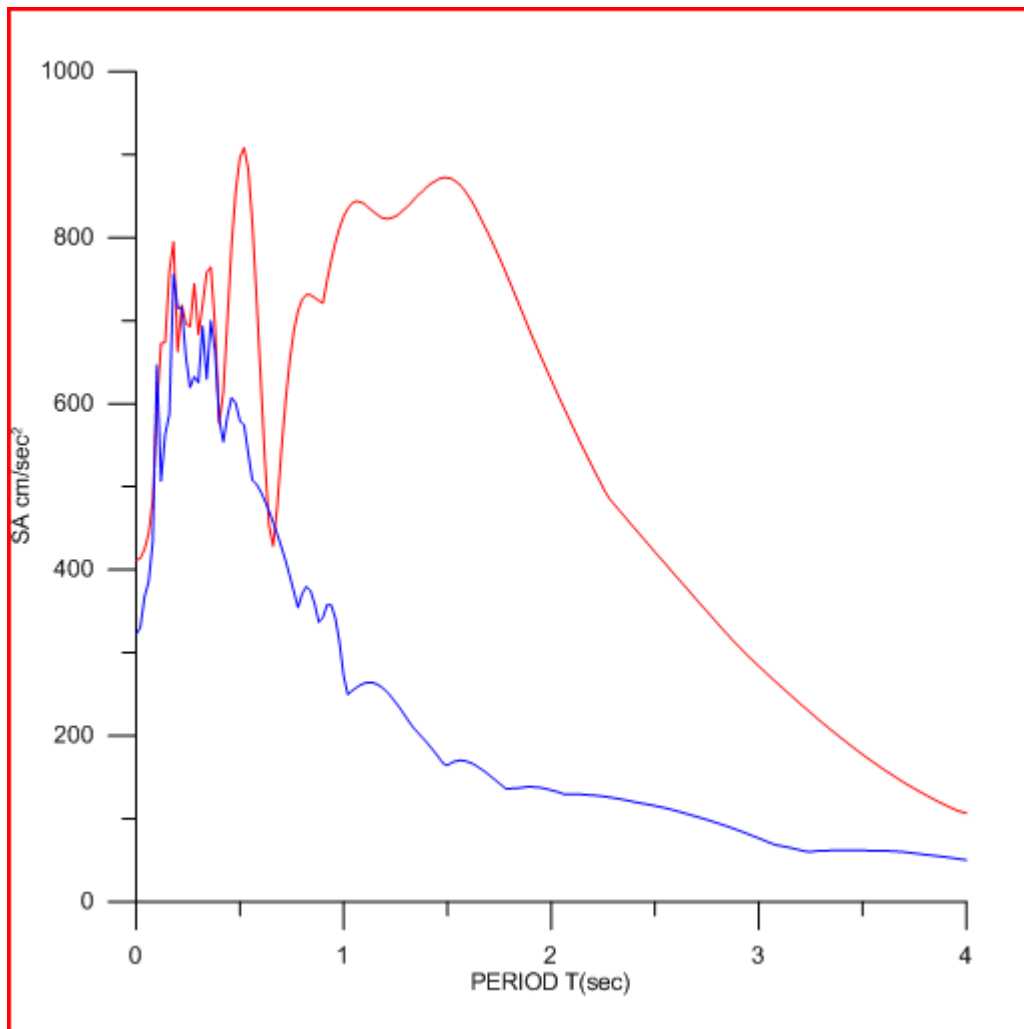
DIRECTIVITY PULSE COMPONENT



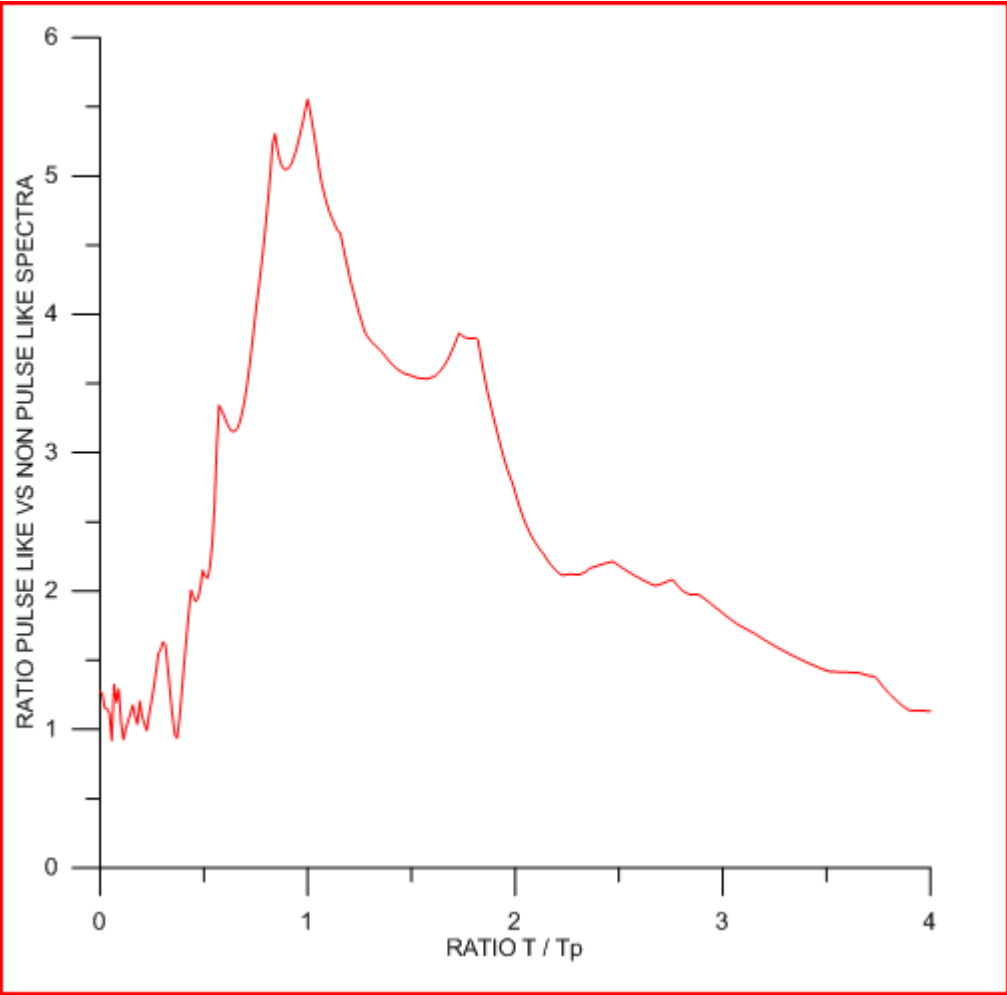
COMBINED PULSE-LIKE GROUND MOTION



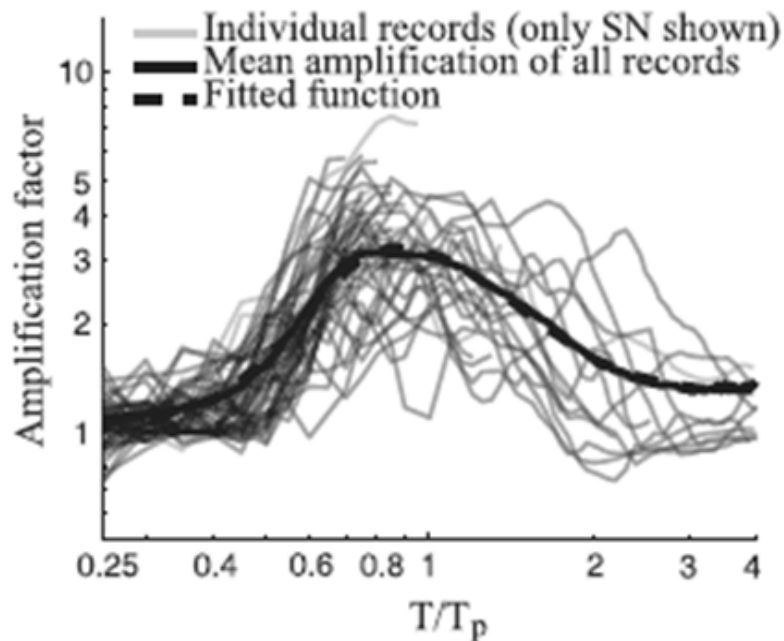
ENERGY FLUX FOR PULSE-LIKE GROUND MOTION



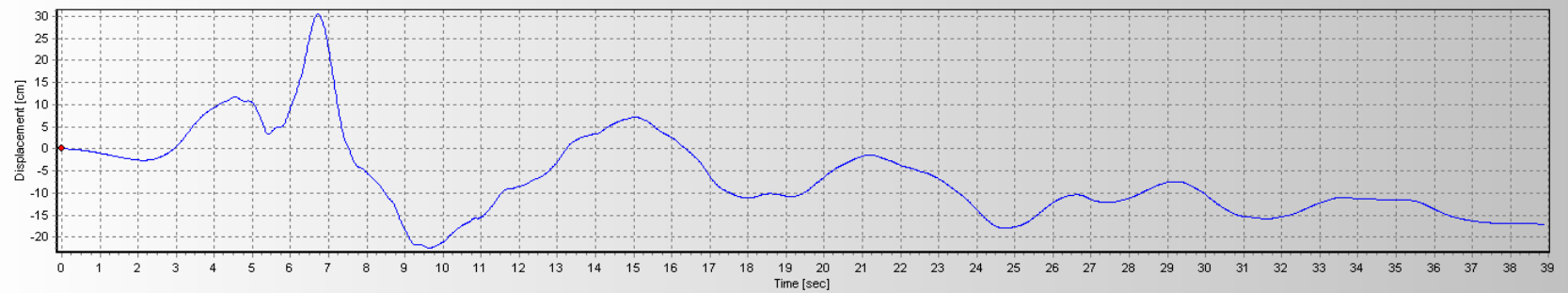
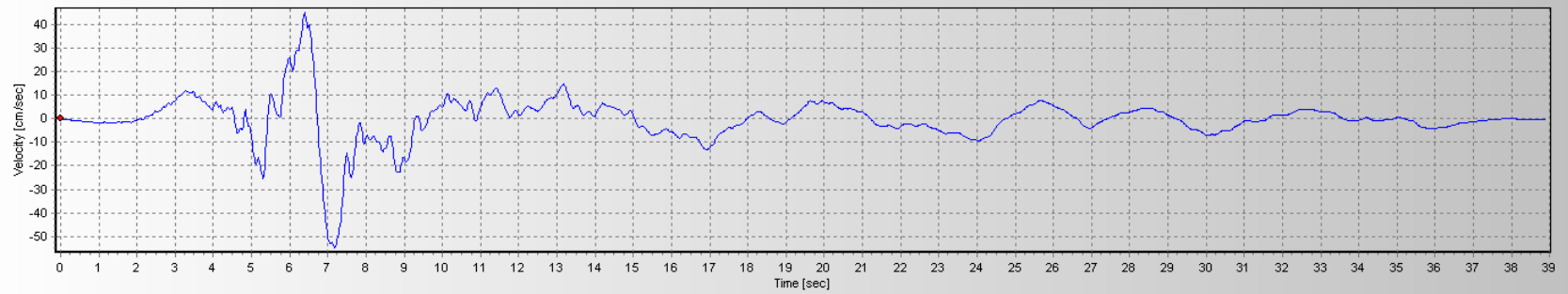
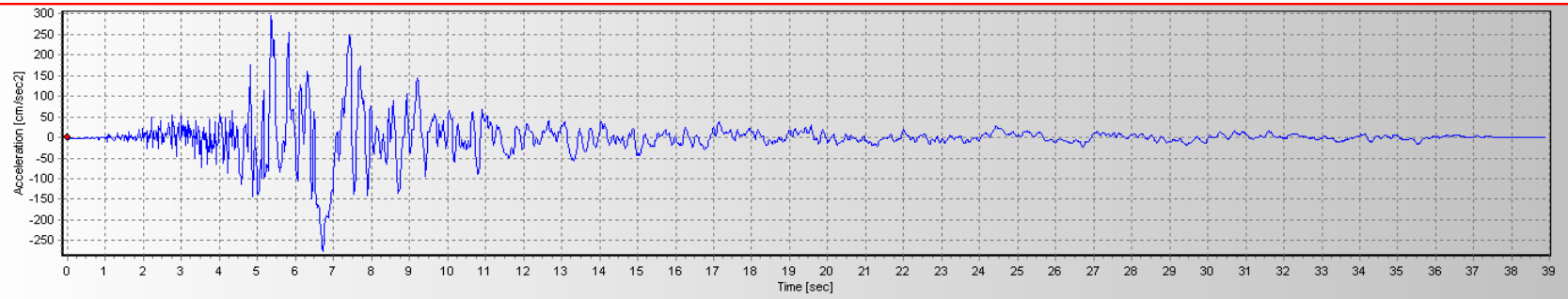
SPECTRA FOR PULSE-LIKE AND NON PULSE-LIKE COMPONENTS



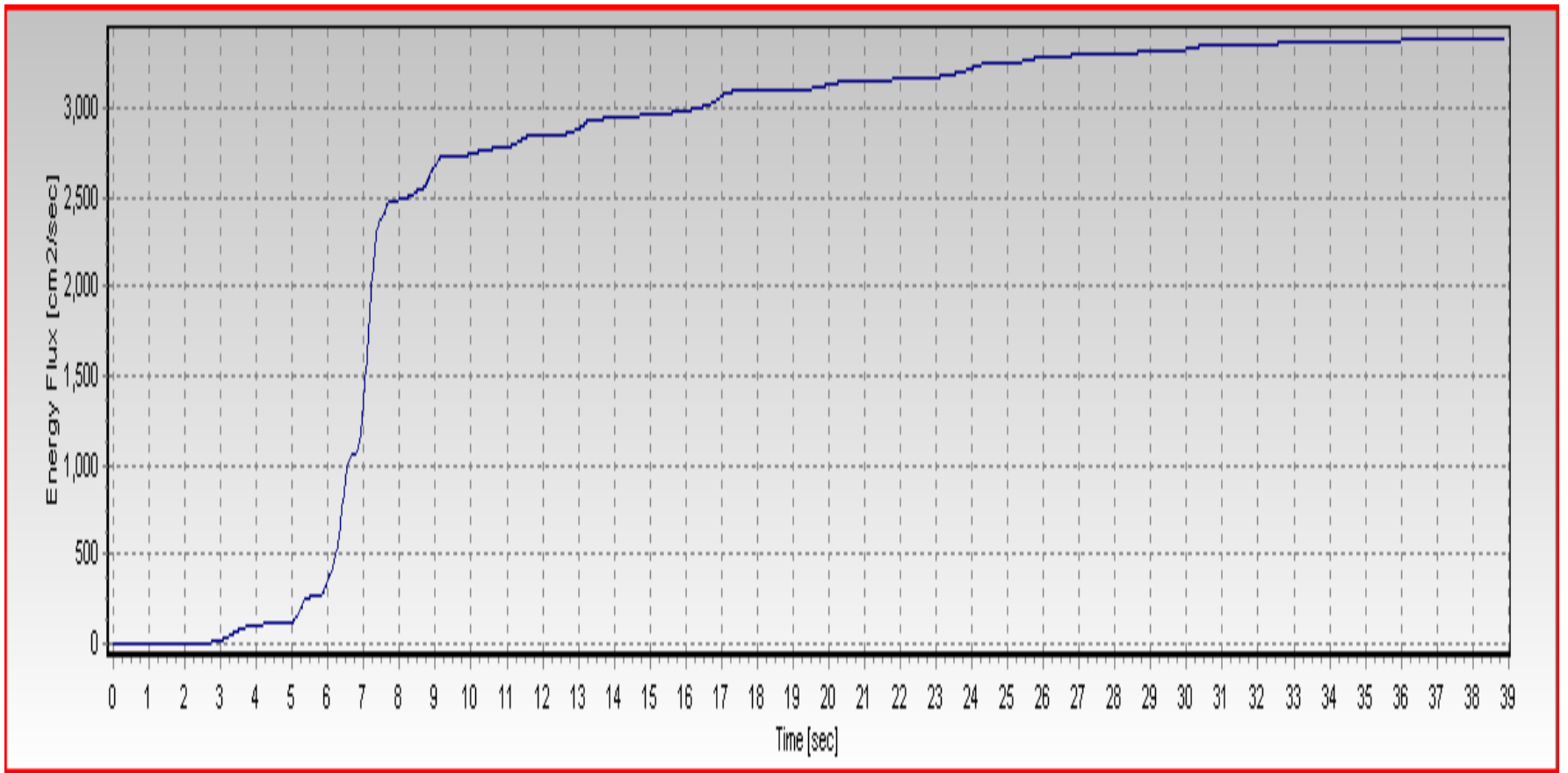
BELL SHAPED AMPLIFICATION AROUND T_p



$$\ln Af = \begin{cases} 1.131 \cdot \exp(-3.11 \cdot [\ln(T/T_p) + 0.127]^2) + 0.058 & \text{via } T \leq 0.88 \cdot T_p \\ 0.896 \cdot \exp(-2.11 \cdot [\ln(T/T_p) + 0.127]^2) + 0.255 & \text{via } T > 0.88 \cdot T_p \end{cases}$$



PULSE LIKE COMPONENT FOR AMPLIFICATION OF 3 AROUND THE T_p PERIOD



ENERGY FLUX FOR PULSE LIKE COMPONENT

