

OPTION 1 -- FREE FIELD ANALYSIS FOR APR1400 profile 9

1

10

10 1. UNITY.MOD: CONSTANT MODULUS CURVE

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.0 1.0 1.00 1.00 1.00 1.00 1.00 1.00

1.00 1.00

10 1. UNITY DAMPING CURVE

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.0 1.0 1.00 1.00 1.00 1.00 1.00 1.00

1.00 1.00

10 2. EPRI(1993): EPRI GENERIC SAND G/Gmax; 0 - 20 FT (6.096 M)

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.0 1.0 0.98 0.914 0.75 0.509 0.27 0.116

0.04 0.02

10 2. EPRI(1993): EPRI GENERIC SAND DAMPING, ORIGINAL; 0 - 20 FT.

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.4 1.5 1.8 2.80 5.0 9.3 15.3 21.9

27.0 30.0

10 3. EPRI(1993): EPRI GENERIC SAND G/Gmax; 21 - 50 FT.(15.24 M)

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.0 1.0 0.99 0.946 0.82 0.608 0.36 0.165

0.06 0.03

10 3. EPRI(1993): EPRI GENERIC SAND DAMPING, ORIGINAL; 21 - 50 FT.

| | | | | | | | |
|--------|----------|-------|---------|------|--------|------|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 1.2 | 1.2 | 1.4 | 2.1 | 3.6 | 7.0 | 12.4 | 19.1 |
| 24.9 | 28.0 | | | | | | |

10 4. EPRI(1993): EPRI GENERIC SAND G/Gmax; 51 - 120 FT.(36.57 M)

| | | | | | | | |
|--------|----------|-------|---------|------|--------|------|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 1.0 | 1.0 | 1.00 | 0.97 | 0.87 | 0.68 | 0.43 | 0.22 |
| 0.09 | 0.05 | | | | | | |

10 4. EPRI(1993): EPRI GENERIC SAND DAMPING; 51 - 120 FT.

| | | | | | | | |
|--------|----------|-------|---------|------|--------|------|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 1.0 | 1.0 | 1.2 | 1.64 | 2.8 | 5.49 | 10.2 | 16.5 |
| 22.9 | 27.0 | | | | | | |

10 5. EPRI(1993): EPRI GENERIC SAND G/Gmax; 121 - 250 FT. (76.20 M)

| | | | | | | | |
|--------|----------|-------|---------|------|--------|------|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 1.0 | 1.0 | 1.00 | 0.98 | 0.90 | 0.74 | 0.50 | 0.27 |
| 0.12 | 0.07 | | | | | | |

10 5. EPRI(1993): EPRI GENERIC SAND DAMPING; 121 - 250 FT.

| | | | | | | | |
|--------|----------|-------|---------|------|--------|-----|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 0.8 | 0.9 | 1.0 | 1.33 | 2.2 | 4.36 | 8.6 | 14.61 |
| 21.2 | 25.0 | | | | | | |

10 6. EPRI(1993): EPRI GENERIC SAND G/Gmax; 251 - 500 FT. (152.39 M)

| | | | | | | | |
|--------|----------|-------|---------|------|--------|------|-------|
| 0.0001 | 0.000316 | 0.001 | 0.00316 | 0.01 | 0.0316 | 0.1 | 0.316 |
| 1.0 | 3.0 | | | | | | |
| 1.0 | 1.0 | 1.00 | 0.988 | 0.93 | 0.791 | 0.57 | 0.321 |
| 0.15 | 0.09 | | | | | | |

10 6. EPRI(1993): EPRI GENERIC SAND DAMPING; 251 - 500 FT.

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

0.7 0.8 0.8 1.12 1.8 3.53 7.1 12.78

19.3 23.0

10 7. EPRI(1993): EPRI GENERIC SAND G/Gmax; 501 - 1000 FT.

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

1.0 1.0 1.00 0.99 0.95 0.852 0.65 0.41

0.20 0.10

10 7. EPRI(1993): EPRI GENERIC SAND DAMPING; 501 - 1000 FT.

0.0001 0.000316 0.001 0.00316 0.01 0.0316 0.1 0.316

1.0 3.0

0.6 0.6 0.6 0.81 1.2 2.5 5.3 10.27

16.7 20.1

10 8. G/Gmax, Silva (1996) soft rock 0-20 ft

0.000100 0.000316 0.001000 0.003160 0.010000 0.031600 0.100000 0.316000

1.000000 3.000000

1.000 1.000 0.990 0.910 0.720 0.460 0.230 0.100

0.027 0.010

10 8. damping, Silva (1996) soft rock 0-20 ft

0.000100 0.000316 0.001000 0.003160 0.010000 0.031600 0.100000 0.316000

1.000000 3.000000

3.300 3.300 3.800 4.900 7.800 12.250 19.000 24.750

29.500 33.500

10 9. G/Gmax, Silva (1996) soft rock 20+ ft

0.000100 0.000316 0.001000 0.003160 0.010000 0.031600 0.100000 0.316000

1.000000 3.000000

1.000 1.000 1.000 1.000 0.950 0.825 0.575 0.340

0.145 0.030

10 9. damping, Silva (1996) soft rock 20+ ft

0.000100 0.000316 0.001000 0.003160 0.010000 0.031600 0.100000 0.316000

1.000000 3.000000

3.100 3.100 3.100 3.250 4.100 5.900 10.000 15.300

22.250 28.400

8 10. SHEAR MODULUS RATIO OF ROCK (Idriss)

.0001 .0003 .001 .003 .01 .03 .1 1.0

1.0 1.0 .9875 .9525 .9000 .8100 .7250 .5500

5 10. DAMPING RATIO OF ROCK (Idriss)

.0001 .001 .01 .1 1.0

.40 .80 1.5 3.0 4.6

10 1 2 3 4 5 6 7 8 9 10

OPTION 2 -- SOIL PROFILE

2

1 96 APR1400 - Profile 9

| | | | | | |
|----|----|-----|------|-------|--------|
| 1 | 10 | 5.0 | 0.02 | 0.145 | 4692.0 |
| 2 | 10 | 5.0 | 0.02 | 0.145 | 4708.8 |
| 3 | 10 | 5.0 | 0.02 | 0.145 | 4725.6 |
| 4 | 10 | 5.0 | 0.02 | 0.145 | 4742.3 |
| 5 | 10 | 5.0 | 0.02 | 0.145 | 4758.9 |
| 6 | 10 | 5.0 | 0.02 | 0.145 | 4775.5 |
| 7 | 10 | 5.0 | 0.02 | 0.145 | 4791.9 |
| 8 | 10 | 5.0 | 0.02 | 0.145 | 4808.3 |
| 9 | 10 | 5.0 | 0.02 | 0.145 | 4824.6 |
| 10 | 10 | 5.0 | 0.02 | 0.145 | 4840.8 |
| 11 | 10 | 5.0 | 0.02 | 0.145 | 4856.9 |
| 12 | 10 | 5.0 | 0.02 | 0.145 | 4872.9 |
| 13 | 10 | 5.0 | 0.02 | 0.145 | 4888.8 |

| | | | | | |
|----|----|------|------|-------|--------|
| 14 | 10 | 5.0 | 0.02 | 0.145 | 4904.7 |
| 15 | 10 | 5.0 | 0.02 | 0.145 | 4920.4 |
| 16 | 10 | 5.0 | 0.02 | 0.145 | 4936.1 |
| 17 | 10 | 5.0 | 0.02 | 0.145 | 4951.7 |
| 18 | 10 | 5.0 | 0.02 | 0.145 | 4967.2 |
| 19 | 10 | 5.0 | 0.02 | 0.145 | 4982.7 |
| 20 | 10 | 5.0 | 0.02 | 0.145 | 4998.0 |
| 21 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 22 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 23 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 24 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 25 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 26 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 27 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 28 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 29 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 30 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 31 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 32 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 33 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 34 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 35 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 36 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 37 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 38 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 39 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 40 | 1 | 5.0 | 0.02 | 0.155 | 9200.0 |
| 41 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 42 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |

| | | | | | |
|----|---|------|------|-------|--------|
| 43 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 44 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 45 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 46 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 47 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 48 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 49 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 50 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 51 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 52 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 53 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 54 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 55 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 56 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 57 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 58 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 59 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 60 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 61 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 62 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 63 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 64 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 65 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 66 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 67 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 68 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 69 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 70 | 1 | 10.0 | 0.02 | 0.155 | 9200.0 |
| 71 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |

| | | | | | |
|----|---|------|-------|-------|--------|
| 72 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 73 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 74 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 75 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 76 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 77 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 78 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 79 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 80 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 81 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 82 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 83 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 84 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 85 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 86 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 87 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 88 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 89 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 90 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 91 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 92 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 93 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 94 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 95 | 1 | 20.0 | 0.02 | 0.155 | 9200.0 |
| 96 | | | 0.004 | 0.155 | 9200.0 |