Elastic wave propagation in embankment dams

Linton, M. D.

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ELASTIC WAVE PROPAGATION IN EMBANKMENT DAMS

APPENDIX B
Time-displacement graphs and stress distributions.

M.D. LINTON

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May 1982.
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Fig. B.1. Finite element grid
Fig. B.2. Layering of model D2
Fig. B.3. Finite element grid: Embankment Section
Fig. B.4. Stress distribution due to body forces for model D1
Fig. B.5. Stress distribution due to body forces for model D1 with hydrostatic pressure on left hand side
Fig. B.6. Stress distribution due to body forces for model D2
Fig. B.1. Finite element grid

Fig. B.2. Layering of model D2

Fig. B.3. Finite element grid: Embankment Section
Static stress distributions
Time-displacement graphs and stress distributions for $\Omega / \Lambda$

P-wave

Angle of incidence $\theta$

Base acceleration $g$
Note. For this and all other time displacement graphs the displacements are for nodes along the height of the column, and for clarity are labeled A to J on this page and on Fig. 6. For each model, x-displacements are given first, followed by y-displacements for the same nodes.
STRESS VECTORS AFTER 0.1400 "
OMITTBD LINES TBBIONAL)

OMITTBD LINES TBBIONAL)

OMITTBD LINES TBBIONAL)
Time-displacement graphs and stress distributions for $\theta/2$

P-wave

Angle of incidence $20^\circ$

Base acceleration $g$
Time-displacement graphs and stress distributions for (X / S)

S-wave
Angle of incidence \( \theta \)
Base acceleration \( g \)
STRESS VECTORS ATTACHED 0.27x10^6 Pa.

STRESS VECTORS ATTACHED 0.30x10^6 Pa.

STRESS VECTORS ATTACHED 0.32x10^6 Pa.
STRESS VECTORS AFTER 0.2500 a.
DOTTED LINES TENSIONAL

STRESS VECTORS AFTER 0.3750 a.

STRESS VECTORS AFTER 0.4000 a.
DOTTED LINES TENSIONAL
Time-displacement graphs and stress distributions for Dl/4

S-wave
Angle of incidence $20^\circ$
Base acceleration $g$
Time-displacement graphs and stress distributions for $\mathbb{D} / \lambda$

P-wave

Angle of incidence $\theta$

Base acceleration $g$
STRESS VECTORS AFTER 0.1400
EXTENDED LINES TENSIONAL
0.1E07 Pa

STRESS VECTORS AFTER 0.1800
EXTENDED LINES TENSIONAL
0.1E07 Pa

STRESS VECTORS AFTER 0.2100
EXTENDED LINES TENSIONAL
0.1E07 Pa
Time-displacement graphs and stress distributions for P-wave

P-wave
Angle of incidence $0^\circ$
Base acceleration $\frac{1}{g}$
Stress vectors after 0.2 m:

- 0.1E07 Pa.

Stress vectors after 0.3 m:

- 0.1E07 Pa.

Stress vectors after 0.4 m:

- 0.1E07 Pa.
Time-displacement graphs and stress distributions for D2/3

P-wave
Angle of incidence 10°
Base acceleration $g$
Time-displacement graphs and stress distributions for D2A

P-wave
Angle of incidence 20°
Base acceleration g
STRESS VECTORS AFTER 0.1200 a.

STRESS VECTORS AFTER 0.1400 a.

STRESS VECTORS AFTER 0.1600 a.

STRESS VECTORS AFTER 0.1800 a.
STRESS VECTORS AFTER 0.1800 a

STRESS VECTORS AFTER 0.2000 a

STRESS VECTORS AFTER 0.2200 a

STRESS VECTORS AFTER 0.2400 a
STRESS VECTORS AFTER 0.2800 s.
(DOTTED LINES TO ILLUSION)
0.1E07 Pa.

STRESS VECTORS AFTER 0.2800 s.
(DOTTED LINES TO ILLUSION)
0.1E07 Pa.

STRESS VECTORS AFTER 0.2800 s.
(DOTTED LINES TO ILLUSION)
0.1E07 Pa.
Time-displacement graphs and stress distributions for D2/5

P-wave
Angle of incidence $20^\circ$
Base acceleration $1g$
STRESS VECTORS AFTER 0.3000 a. (DOTTED LINES TB4IS0NAU)

STRESS VECTORS AFTER 0.3200 a. (DOTTED LINES TB4IS0NAU)

STRESS VECTORS AFTER 0.3300 a. (DOTTED LINES TB4IS0NAU)

STRESS VECTORS AFTER 0.3400 a. (DOTTED LINES TB4IS0NAU)
Time-displacement graphs and stress distributions for S-wave

S-wave
Angle of incidence $\phi$
Base acceleration $g$
STRESS VECTORS AFTER 0.2000 a.
(DOTTED LINES TENSIONAL)

STRESS VECTORS AFTER 0.2750 a.

STRESS VECTORS AFTER 0.3000 a.
(DOTTED LINES TENSIONAL)
STRESS VECTORS AFTER 0.32s

DOTTED LINES

0.1E07 Pa.

STRESS VECTORS AFTER 0.3500

DOTTED LINES

0.1E07 Pa.

STRESS VECTORS AFTER 0.3750

DOTTED LINES

0.1E07 Pa.
Time-displacement graphs and stress distributions for S-wave

S-wave
Angle of incidence \( \theta \)
Base acceleration \( ig \)
Time-displacement graphs and stress distributions for D2/8

S-wave
Angle of incidence $10^\circ$
Base acceleration $g$
Stress distributions for \( \Omega / \phi \)

S-wave

Angle of incidence \( \theta = 20^\circ \)

Base acceleration \( g \)
Time-displacement graphs and stress distributions for D2/10

S-wave
Angle of incidence 20°
Base acceleration \( jg \)
STRESS VECTORS AFTER 0.1750 a.
CUTTED LINES TENSIONAL

STRESS VECTORS AFTER 0.2000 a.
CUTTED LINES TENSIONAL

STRESS VECTORS AFTER 0.2250 a.
CUTTED LINES TENSIONAL
STRESS VECTORS AFTER 0.5000 a.  
DOTTED LINES TENSIONAL

STRESS VECTORS AFTER 0.5750 a.  
DOTTED LINES TENSIONAL

STRESS VECTORS AFTER 0.6000 a.  
DOTTED LINES TENSIONAL
Time-displacement graphs and stress distributions for D2/11

S-wave of incidence 30°

Base acceleration g
STRESS VECTORS BEFORE 6.4 AREA.
SLOTTED LIMIT THEORETICAL.

STRESS VECTORS AFTER 6.4 AREA.
SLOTTED LIMIT THEORETICAL.
STRESS VECTORS AFTER 0.4750 " OTTB) LINES (B)CMU

STRESS VECTORS AFTER 0.5000 " TENSIOUU

STRESS VECTORS AFTER 0.5250 " (B)CMU

V