ΠΑΡΑΡΤΗΜΑΤΑ

ΠΑΡΑΡΤΗΜΑ Ι

ΠΡΟΣΟΜΟΙΩΜΑΤΑ ΚΑΙ ΥΠΟΛΟΓΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ ΑΝΑΛΥΣΗΣ ΤΩΝ ΔΙΑΤΟΜΩΝ ΤΩΝ ΔΟΚΩΝ

XTRACT Material Report -

For use only in an academic or research setting.

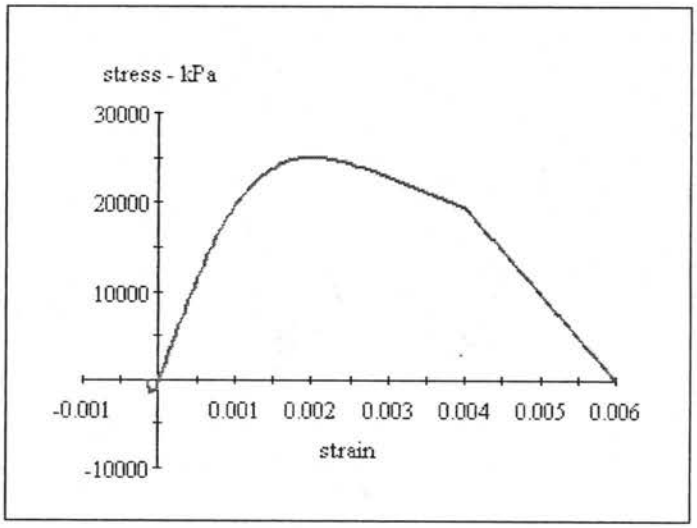
Material Name: Unconfined1

Material Type: Unconfined Concrete

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Tension Strength:	-2000 kPa
28 Day Strength:	25.00E+3 kPa
Post Crushing Strength:	0 kPa
Tension Strain Capacity:	84.39E-6 Compression
Spalling Strain:	6.000E-3 Tension
Crushing Strain:	1.0000 Compression
Elastic Modulus:	2.37E+7 kPa
Secant Modulus:	1813 kPa



Model Details:

For Strain - $\varepsilon < 2 \cdot \varepsilon_t$ $fc = 0$

For Strain - $\varepsilon < 0$ $fc = \varepsilon \cdot Ec$

For Strain - $\varepsilon < \varepsilon_{cu}$ $fc = \dfrac{f'_c \cdot x \cdot r}{r - 1 + x^r}$

For Strain - $\varepsilon < \varepsilon_{sp}$ $fc = f_{cu} + \left(f_{cp} - f_{cu}\right) \cdot \dfrac{\left(\varepsilon - \varepsilon_{cu}\right)}{\left(\varepsilon_{sp} - \varepsilon_{cu}\right)}$

$$x = \frac{\varepsilon}{\varepsilon_{cc}}$$

$$r = \frac{Ec}{Ec - E_{sec}}$$

$$E_{sec} = \frac{f'_c}{\varepsilon_{cc}}$$

ε = Concrete Strain

fc = Concrete Stress

Ec = Elastic Modulus

E_{sec} = Secant Modulus

ε_t = Tension Strain Capacity

ε_{cu} = Ultimate Concrete Strain

ε_{cc} = Strain at Peak Stress = .002

ε_{sp} = Spalling Strain

f'_c = 28 Day Compressive Strength

f_{cu} = Stress at ε_{cu}

f_{cp} = Post Spalling Strength

Material Color States:

- Tension strain after tension capacity
- Tension strain before tension capacity
- Initial state
- Compression before crushing strain
- Compression before end of spalling
- Compression after spalling

Reference:

Mander, J.B., Priestley, M. J. N., "Observed Stress-Strain Behavior of Confined Concrete", Journal of Structural Engineering, ASCE, Vol. 114, No. 8, August 1988, pp. 1827-1849

XTRACT Material Report -

For use only in an academic or research setting.

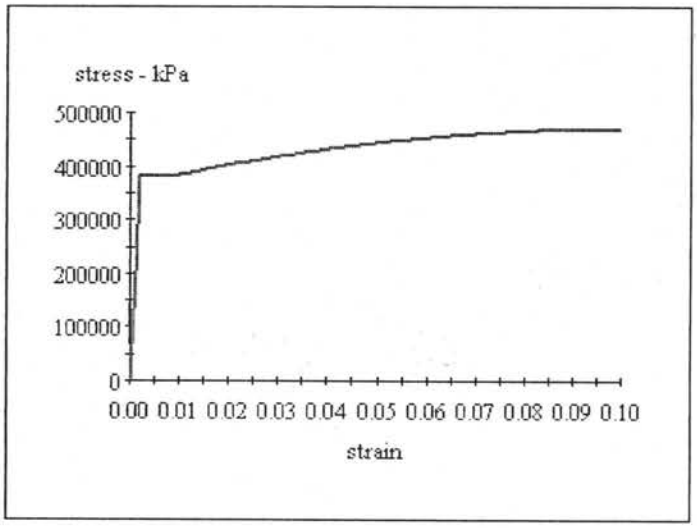
Material Name: Steel1

Material Type: Strain Hardening Steel

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Yield Stress:	380.0E+3 kPa
Fracture Stress:	470.0E+3 kPa
Yield Strain:	1.900E-3
Strain at Strain Hardening:	8.000E-3
Failure Strain:	.1000
Elastic Modulus:	2.00E+8 kPa
Additional Information:	Symetric Tension and Comp.



Model Details:

For Strain - $\varepsilon < \varepsilon_y$ $fs = E \cdot \varepsilon$

For Strain - $\varepsilon < \varepsilon_{sh}$ $fs = f_y$

For Strain - $\varepsilon < \varepsilon_{su}$ $fs = f_u - (f_u - f_y) \cdot \left(\frac{\varepsilon_{su} - \varepsilon}{\varepsilon_{su} - \varepsilon_{sh}} \right)^2$

ε = Steel Strain

fs = Steel Stress

f_y = Yield Stress

f_u = Fracture Stress

ε_y = Yield Strain

ε_{sh} = Strain at Strain Hardening

ε_{su} = Failure Strain

E = Elastic Modulus

Material Color States:

- Tension force after onset of strain hardening
- Tension force after yield
- Initial state
- Compression force after yield
- Compression force after onset of strain hardening

XTRACT Material Report -

For use only in an academic or research setting.

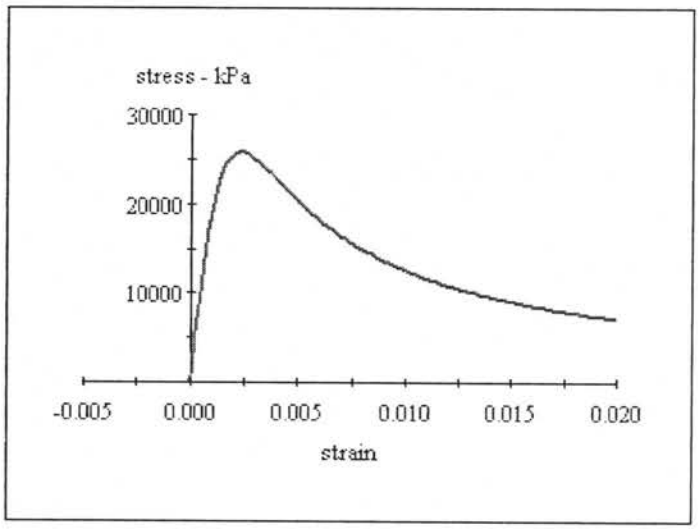
Material Name: Confined2

Material Type: Confined Concrete

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Tension Strength:	-2000 kPa
28 Day Strength:	25.00E+3 kPa
Confined Concrete Strength:	25.78E+3 kPa
Tension Strain Capacity:	84.39E-6 Compression
Strain at Peak Stress:	2.312E-3
Crushing Strain:	20.00E-3 Compression
Elastic Modulus:	2.37E+7 kPa
Secant Modulus:	1617 kPa



Model Details:

For Strain - $\varepsilon < 2 \cdot \varepsilon_t$	$fc = 0$
For Strain - $\varepsilon < 0$	$fc = \varepsilon \cdot Ec$
For Strain - $\varepsilon < \varepsilon_{cu}$	$fc = \frac{f'_{cc} \cdot x \cdot r}{r - 1 + x^r}$

$$x = \frac{\varepsilon}{\varepsilon_{cc}}$$

$$\varepsilon_{cc} = .002 \cdot \left[1 + 5 \cdot \left(\frac{f'_{cc}}{f'_c} - 1 \right) \right]$$

$$r = \frac{Ec}{Ec - E_{sec}}$$

$$E_{sec} = \frac{f'_{cc}}{\varepsilon_{cc}}$$

ε = Concrete Strain

fc = Concrete Stress

Ec = Elastic Modulus

ε_t = Tension Strain Capacity

ε_{cu} = Ultimate Concrete Strain

ε_{cc} = Strain at Peak Stress

f'_c = 28 Day Compressive Strength

f'_{cc} = Confined Concrete Strength

Material Color States:

- Tension strain after tension capacity
- Tension strain before tension capacity
- Initial state
- Compression before crushing strain

Reference:

Mander, J.B., Priestley, M. J. N., "Observed Stress-Strain Behavior of Confined Concrete", Journal of Structural Engineering, ASCE, Vol. 114, No. 8, August 1988, pp. 1827-1849

XTRACT Material Report -

For use only in an academic or research setting.

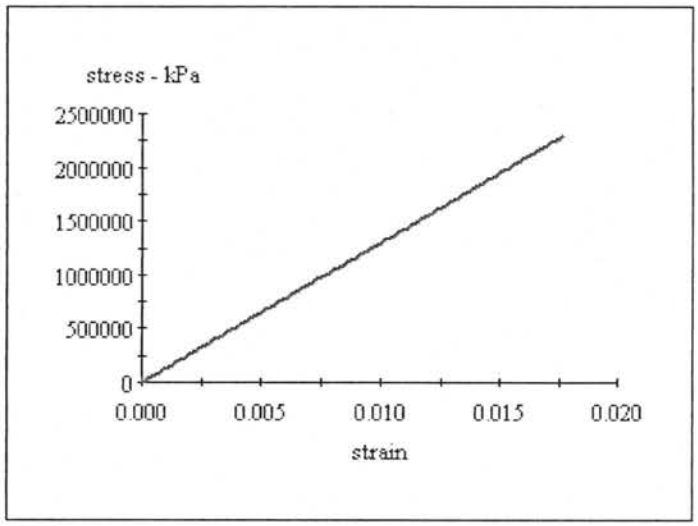
Material Name: Mbar_frac

Material Type: Bilinear Steel

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Yield Stress:	2.300E+6 kPa
Yield Strain:	17.69E-3
Failure Strain:	17.70E-3
Elastic Modulus:	1.30E+8 kPa
Material Hardening:	1.000E-6
Additional Information:	Symetric Tension and Comp.



Model Details:

For Strain - $\varepsilon < \varepsilon_y$	$fs = E \cdot \varepsilon$
For Strain - $\varepsilon < \varepsilon_{su}$	$fs = f_y + H \cdot E \cdot (\varepsilon - \varepsilon_y)$

ε = Steel Strain

fs = Steel Stress

f_y = Yield Stress

ε_y = Yield Strain

ε_{su} = Failure Strain

E = Elastic Modulus

H = Material Hardening

Material Color States:

- Tension force after yield
- Initial state
- Compression force after yield

XTRACT Material Report -

For use only in an academic or research setting.

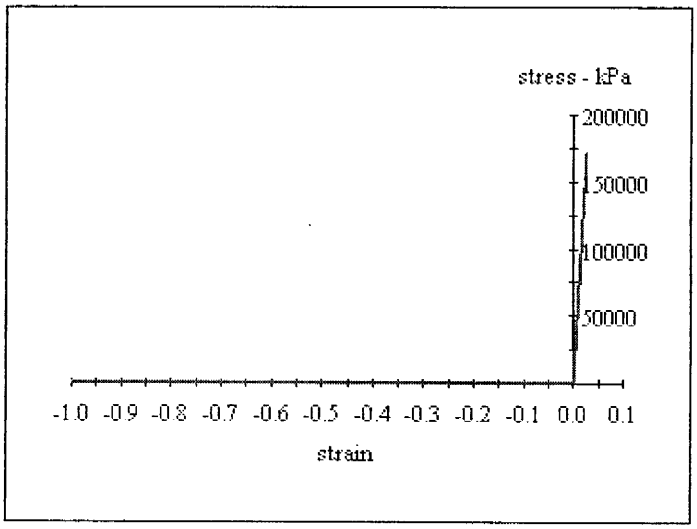
Material Name: G60FRP

Material Type: User Defined

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Ultimate Compresive Strain:	28.00E-3
Compression Yield Strain:	26.15E-3
Tensile Yield Strain:	26.15E-3
Ultimate Tensile Strain:	28.00E-3
Additional Information:	G60AR by MasterBuilders I



Material Color States:

Color State

Stress Strain Points:

Strain	Stress (kPa)
-1.000	0
0	0
26.15E-3	170.0E+3
28.00E-3	170.0E+3

XTRACT Material Report -

For use only in an academic or research setting.

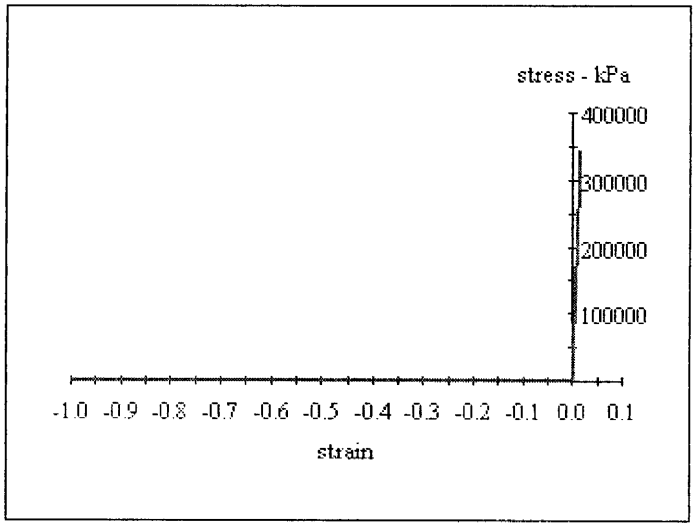
Material Name: C130

Material Type: User Defined

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Ultimate Compresive Strain:	15.00E-3
Compression Yield Strain:	14.90E-3
Tensile Yield Strain:	14.90E-3
Ultimate Tensile Strain:	15.00E-3
Additional Information:	C1-30 by MasterBuilders I



Material Color States:

Color State

Stress Strain Points:

Strain	Stress (kPa)
-1.000	0
0	0
14.90E-3	343.0E+3
15.00E-3	343.0E+3

XTRACT Material Report -

For use only in an academic or research setting.

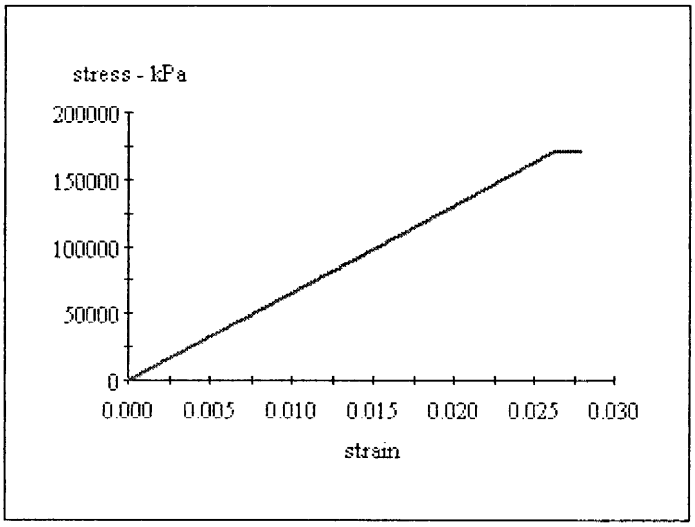
Material Name: G60FRP_comp

Material Type: User Defined

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Ultimate Compresive Strain:	28.00E-3
Compression Yield Strain:	26.15E-3
Tensile Yield Strain:	26.15E-3
Ultimate Tensile Strain:	28.00E-3
Additional Information:	Symetric Tension and Comp.



Material Color States:

■ Color State

Stress Strain Points:

Strain	Stress (kPa)
0	0
26.15E-3	170.0E+3
28.00E-3	170.0E+3

XTRACT Material Report -

For use only in an academic or research setting.

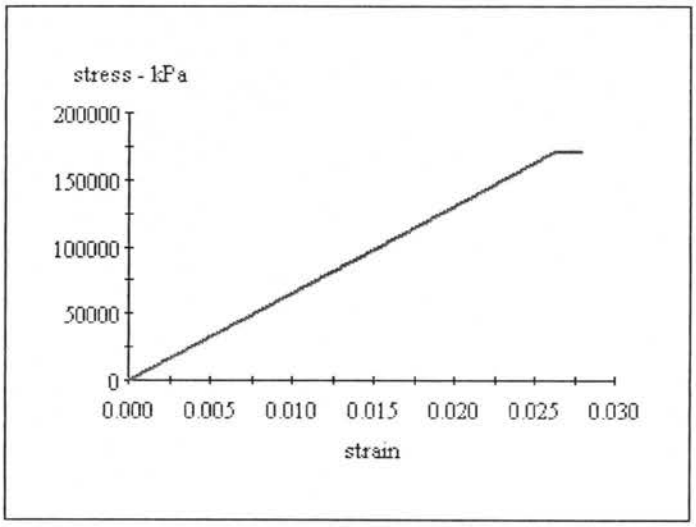
Material Name: G60FRP_comp

Material Type: User Defined

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Ultimate Compresive Strain:	28.00E-3
Compression Yield Strain:	26.15E-3
Tensile Yield Strain:	26.15E-3
Ultimate Tensile Strain:	28.00E-3
Additional Information:	Symetric Tension and Comp.



Material Color States:

■ Color State

Stress Strain Points:

Strain	Stress (kPa)
0	0
26.15E-3	170.0E+3
28.00E-3	170.0E+3

XTRACT Material Report -

For use only in an academic or research setting.

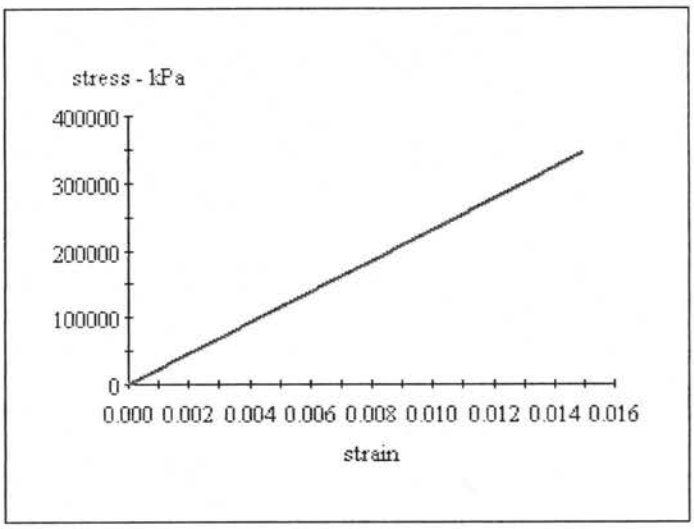
Material Name: C130comp

Material Type: User Defined

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Input Parameters:

Ultimate Compresive Strain:	15.00E-3
Compression Yield Strain:	14.90E-3
Tensile Yield Strain:	14.90E-3
Ultimate Tensile Strain:	15.00E-3
Additional Information:	Symetric Tension and Comp.



Material Color States:

Color State

Stress Strain Points:

Strain	Stress (kPa)
0	0
14.90E-3	343.0E+3
15.00E-3	343.0E+3

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: Mbar_Fracture

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua

23/5/2005

Oasp beam

oasp beam NEAK - MBAR

Section Details:

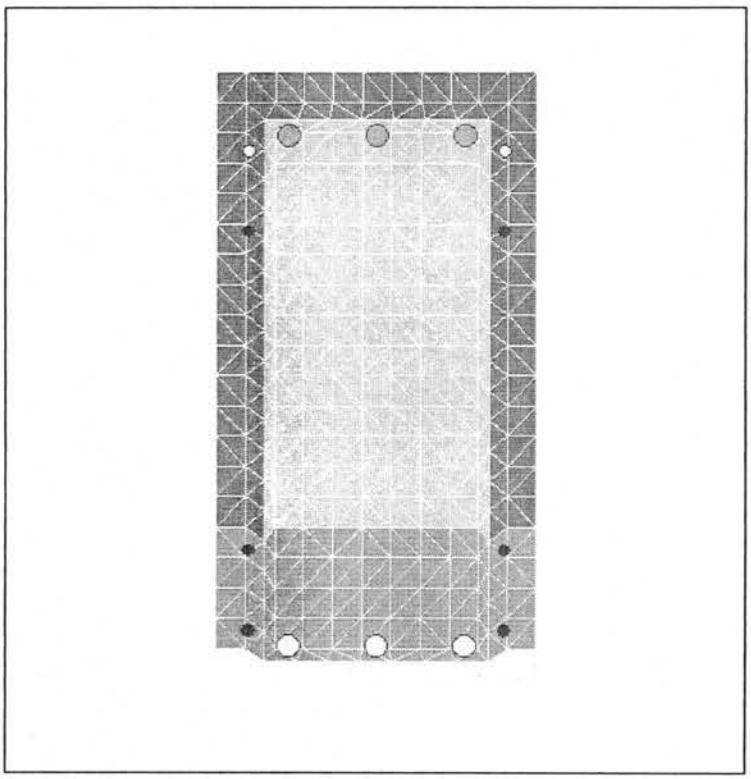
X Centroid:	-.6087E-17 m
Y Centroid:	-.1264E-16 m
Section Area:	80.00E-3 m^2

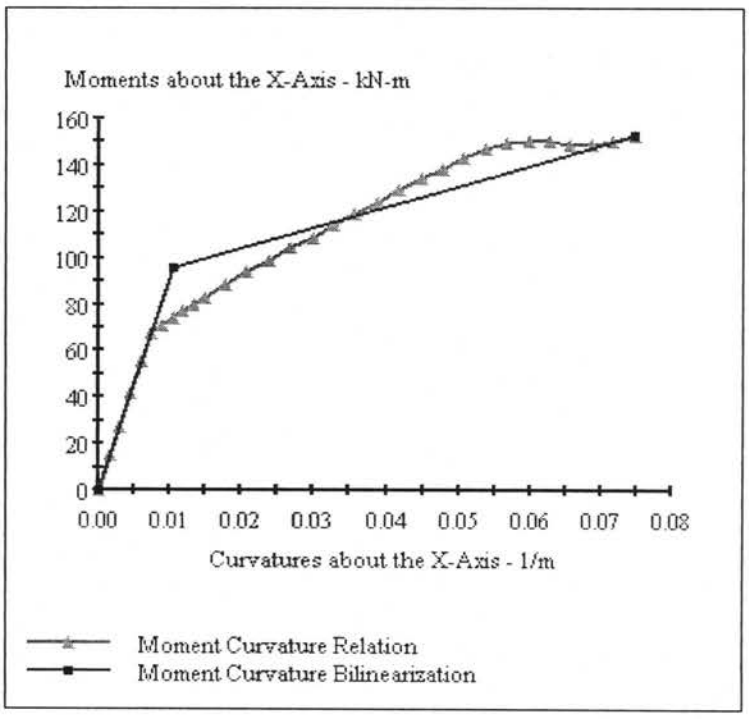
Loading Details:

Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Mbar_frac
Failure Strain:	17.70E-3 Tension
Curvature at Initial Load:	0 1/m
Curvature at First Yield:	7.363E-3 1/m
Ultimate Curvature:	74.67E-3 1/m
Moment at First Yield:	67.18 kN-m
Ultimate Moment:	152.6 kN-m
Centroid Strain at Yield:	.7220E-3 Tension
Centroid Strain at Ultimate:	6.533E-3 Tension
N.A. at First Yield:	98.06E-3 m
N.A. at Ultimate:	87.48E-3 m
Energy per Length:	8.477 kN
Effective Yield Curvature:	10.51E-3 1/m
Effective Yield Moment:	95.90 kN-m
Over Strength Factor:	1.592
Plastic Rotation Capacity:	14.85E-3 rad
EI Effective:	9.124E+6 N-m^2
Yield EI Effective:	884.3E+3 N-m^2
Bilinear Harding Slope:	9.692 %
Curvature Ductility:	7.104





XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: Mbar_Fracture

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
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Mxx (kN-m)	Kxx (1/m)
0	0
15.17	1.482E-3
27.56	2.965E-3
41.52	4.447E-3
55.22	5.930E-3
67.59	7.412E-3
71.10	8.895E-3
74.27	10.38E-3
76.79	11.86E-3
79.67	13.34E-3
82.76	14.82E-3
88.09	17.82E-3
93.86	20.81E-3
98.98	23.80E-3
104.3	26.79E-3
108.8	29.79E-3
113.9	32.78E-3
119.0	35.77E-3
124.0	38.76E-3
129.2	41.76E-3
134.5	44.75E-3
138.6	47.74E-3
143.3	50.73E-3
147.1	53.73E-3
149.4	56.72E-3
150.6	59.71E-3
150.7	62.70E-3
148.6	65.69E-3
149.1	68.69E-3
150.6	71.68E-3
152.6	74.67E-3

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: NEAK

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
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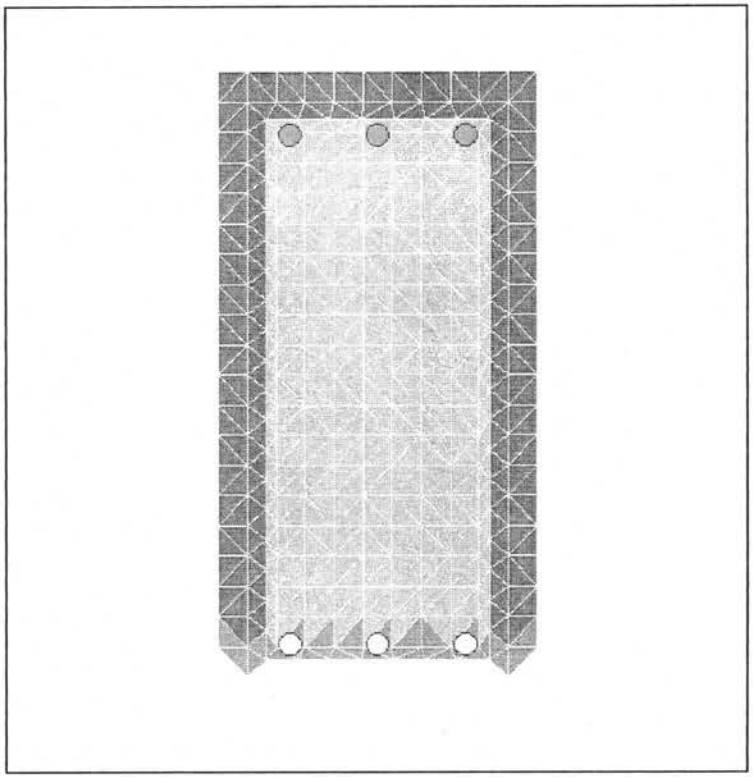
Section Details:

X Centroid:	-.6204E-17 m
Y Centroid:	-.1279E-16 m
Section Area:	80.00E-3 m^2

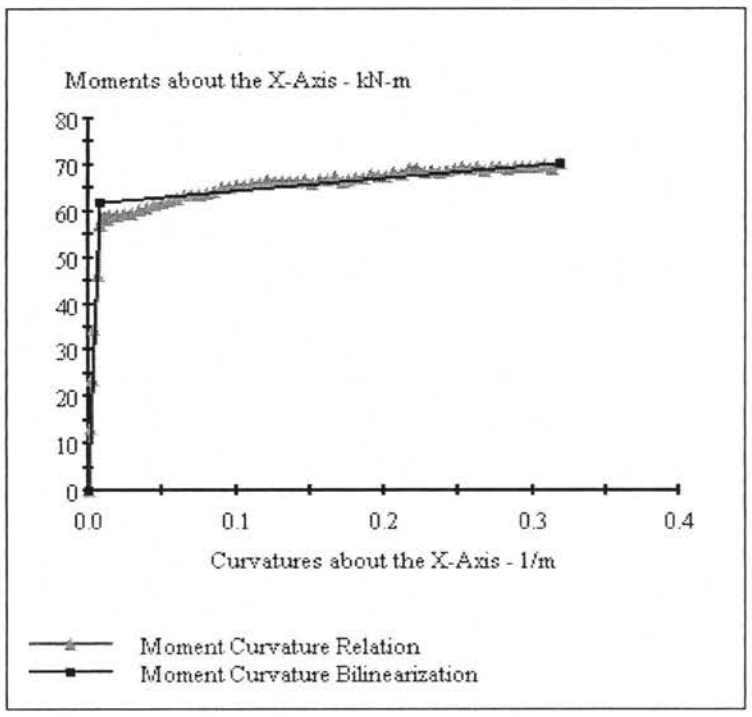


Loading Details:

Incrementing Loads:	Mxx Only
Number of Points:	70
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Not Available
Failure Strain:	-------
Curvature at Initial Load:	0 1/m
Curvature at First Yield:	7.167E-3 1/m
Ultimate Curvature:	.3182 1/m
Moment at First Yield:	57.18 kN-m
Ultimate Moment:	70.26 kN-m
Centroid Strain at Yield:	.7533E-3 Tension
Centroid Strain at Ultimate:	48.99E-3 Tension
N.A. at First Yield:	.1051 m
N.A. at Ultimate:	.1539 m
Energy per Length:	20.79 kN
Effective Yield Curvature:	7.783E-3 1/m
Effective Yield Moment:	62.09 kN-m
Over Strength Factor:	1.132
Plastic Rotation Capacity:	71.85E-3 rad
EI Effective:	7.978E+6 N-m^2
Yield EI Effective:	26.31E+3 N-m^2
Bilinear Harding Slope:	.3297 %
Curvature Ductility:	40.89



XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: NEAK

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
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Myy (kN-m)	Kxx (1/m)
0	0
3.741E-3	1.434E-3
2.315E-3	2.868E-3
8.030E-3	4.302E-3
10.07E-3	5.736E-3
11.91E-3	7.170E-3
17.37E-3	8.604E-3
18.01E-3	10.04E-3
9.782E-3	11.47E-3
13.99E-3	12.91E-3
17.75E-3	14.34E-3
3.131E-3	19.41E-3
12.19E-3	24.47E-3
14.31E-3	29.54E-3
16.05E-3	34.60E-3
11.88E-3	39.67E-3
6.566E-3	44.73E-3
3.844E-3	49.80E-3
.5980E-3	54.86E-3
-1.058E-3	59.93E-3
-2.588E-3	64.99E-3
-5.504E-3	70.06E-3
-6.506E-3	75.12E-3
-7.542E-3	80.19E-3
-6.965E-3	85.25E-3
-8.683E-3	90.31E-3
-7.566E-3	95.38E-3
-7.600E-3	.1004
-7.262E-3	.1055
-10.53E-3	.1106
-11.52E-3	.1156

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: NEAK

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua

23/5/2005

Oasp beam

oasp beam NEAK - MBAR

Myy (kN-m)	Kxx (1/m)
-10.11E-3	.1207
-11.95E-3	.1258
-8.942E-3	.1308
-5.608E-3	.1359
-3.482E-3	.1410
2.963E-3	.1460
3.068E-3	.1511
10.89E-3	.1562
13.18E-3	.1612
21.22E-3	.1663
19.90E-3	.1714
24.15E-3	.1764
24.69E-3	.1815
24.06E-3	.1865
25.51E-3	.1916
24.32E-3	.1967
23.71E-3	.2017
26.04E-3	.2068
25.32E-3	.2119
28.56E-3	.2169
28.77E-3	.2220
26.14E-3	.2271
27.36E-3	.2321
25.76E-3	.2372
27.95E-3	.2423
28.97E-3	.2473
30.64E-3	.2524
28.25E-3	.2575
29.63E-3	.2625
26.78E-3	.2676
29.33E-3	.2727

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: NEAK

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
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Myy (kN-m)	Kxx (1/m)
29.28E-3	.2777
28.28E-3	.2828
29.43E-3	.2878
29.66E-3	.2929
29.03E-3	.2980
29.04E-3	.3030
29.33E-3	.3081
26.18E-3	.3132
30.35E-3	.3182

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: C130NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
Page __ of __

Section Details:

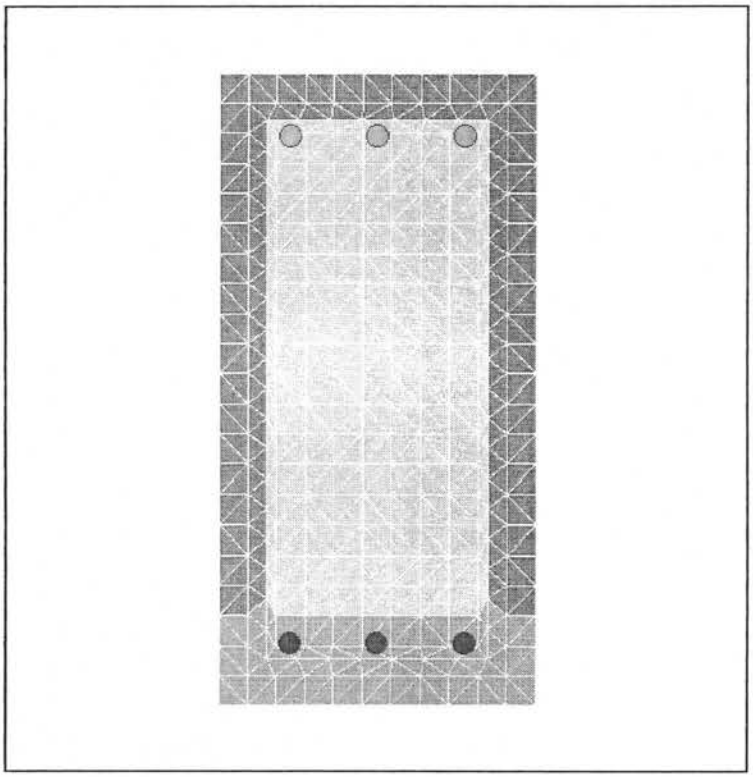
X Centroid:	-.6204E-17 m
Y Centroid:	-.1279E-16 m
Section Area:	80.66E-3 m^2

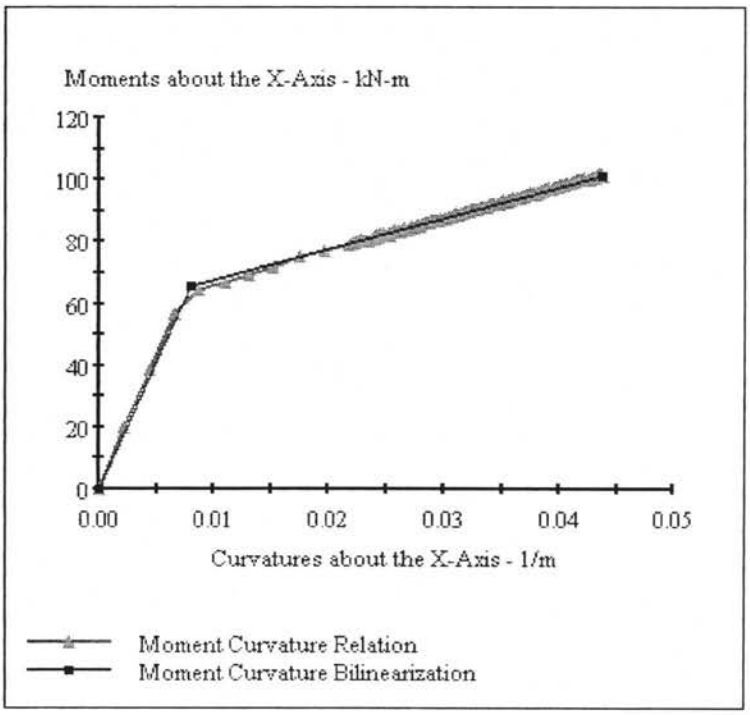
Loading Details:

Incrementing Loads:	Mxx Only
Number of Points:	130
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	C130
Failure Strain:	15.00E-3 Tension
Curvature at Initial Load:	0 1/m
Curvature at First Yield:	7.186E-3 1/m
Ultimate Curvature:	43.85E-3 1/m
Moment at First Yield:	59.13 kN-m
Ultimate Moment:	101.4 kN-m
Centroid Strain at Yield:	.7503E-3 Tension
Centroid Strain at Ultimate:	6.194E-3 Tension
N.A. at First Yield:	.1044 m
N.A. at Ultimate:	.1413 m
Energy per Length:	3.261 kN
Effective Yield Curvature:	8.001E-3 1/m
Effective Yield Moment:	65.83 kN-m
Over Strength Factor:	1.540
Plastic Rotation Capacity:	8.296E-3 rad
EI Effective:	8.228E+6 N-m^2
Yield EI Effective:	992.1E+3 N-m^2
Bilinear Harding Slope:	12.06 %
Curvature Ductility:	5.481





XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: C130NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

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Oasp beam
oasp beam NEAK - MBAR
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Mxx (kN-m)	Kxx (1/m)
0	0
19.76	2.187E-3
38.50	4.375E-3
56.95	6.562E-3
64.58	8.750E-3
67.13	10.94E-3
69.64	13.12E-3
72.04	15.31E-3
75.33	17.50E-3
76.94	19.69E-3
78.91	21.87E-3
79.73	22.06E-3
79.40	22.24E-3
80.22	22.42E-3
79.90	22.61E-3
80.70	22.79E-3
80.36	22.97E-3
80.01	23.16E-3
80.20	23.34E-3
80.38	23.52E-3
80.55	23.71E-3
80.71	23.89E-3
82.04	24.07E-3
81.60	24.25E-3
82.33	24.44E-3
81.87	24.62E-3
82.58	24.80E-3
82.10	24.99E-3
82.79	25.17E-3
82.29	25.35E-3
82.97	25.54E-3

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: C130NoComp

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Mxx (kN-m)	Kxx (1/m)
83.64	25.72E-3
83.08	25.90E-3
83.77	26.09E-3
83.12	26.27E-3
83.79	26.45E-3
84.46	26.64E-3
83.77	26.82E-3
84.43	27.00E-3
85.07	27.18E-3
84.36	27.37E-3
84.99	27.55E-3
85.62	27.73E-3
84.87	27.92E-3
85.48	28.10E-3
86.09	28.28E-3
86.00	28.47E-3
86.25	28.65E-3
86.83	28.83E-3
86.71	29.02E-3
86.94	29.20E-3
86.80	29.38E-3
87.00	29.57E-3
87.56	29.75E-3
87.39	29.93E-3
87.57	30.12E-3
88.11	30.30E-3
87.90	30.48E-3
88.06	30.66E-3
88.58	30.85E-3
89.09	31.03E-3
88.85	31.21E-3

XTRACT Analysis Report -

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Section Name: C130NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

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Oasp beam
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Mxx (kN-m)	Kxx (1/m)
88.97	31.40E-3
89.47	31.58E-3
89.96	31.76E-3
89.68	31.95E-3
89.78	32.13E-3
90.25	32.31E-3
90.71	32.50E-3
90.42	32.68E-3
90.54	32.86E-3
90.94	33.05E-3
91.35	33.23E-3
91.14	33.41E-3
91.23	33.59E-3
91.61	33.78E-3
91.99	33.96E-3
92.36	34.14E-3
92.14	34.33E-3
92.20	34.51E-3
92.56	34.69E-3
92.91	34.88E-3
93.26	35.06E-3
93.01	35.24E-3
93.05	35.43E-3
93.39	35.61E-3
93.72	35.79E-3
94.04	35.98E-3
94.36	36.16E-3
94.08	36.34E-3
94.09	36.53E-3
94.40	36.71E-3
94.70	36.89E-3

XTRACT Analysis Report -

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Section Name: C130NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

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Oasp beam
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Mxx (kN-m)	Kxx (1/m)
95.00	37.07E-3
95.30	37.26E-3
95.59	37.44E-3
95.88	37.62E-3
95.55	37.81E-3
96.14	37.99E-3
96.11	38.17E-3
96.38	38.36E-3
96.65	38.54E-3
96.92	38.72E-3
97.17	38.91E-3
97.43	39.09E-3
97.06	39.27E-3
97.63	39.46E-3
97.57	39.64E-3
97.81	39.82E-3
98.04	40.00E-3
98.28	40.19E-3
98.51	40.37E-3
98.73	40.55E-3
98.96	40.74E-3
99.17	40.92E-3
99.39	41.10E-3
99.60	41.29E-3
99.80	41.47E-3
100.0	41.65E-3
100.2	41.84E-3
100.0	42.02E-3
100.4	42.20E-3
100.2	42.39E-3
100.4	42.57E-3

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: C130NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR
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Mxx (kN-m)	Kxx (1/m)
100.6	42.75E-3
100.7	42.93E-3
100.9	43.12E-3
101.1	43.30E-3
102.0	43.48E-3
101.7	43.67E-3
101.4	43.85E-3

XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: G60NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua
23/5/2005
Oasp beam
oasp beam NEAK - MBAR

Section Details:

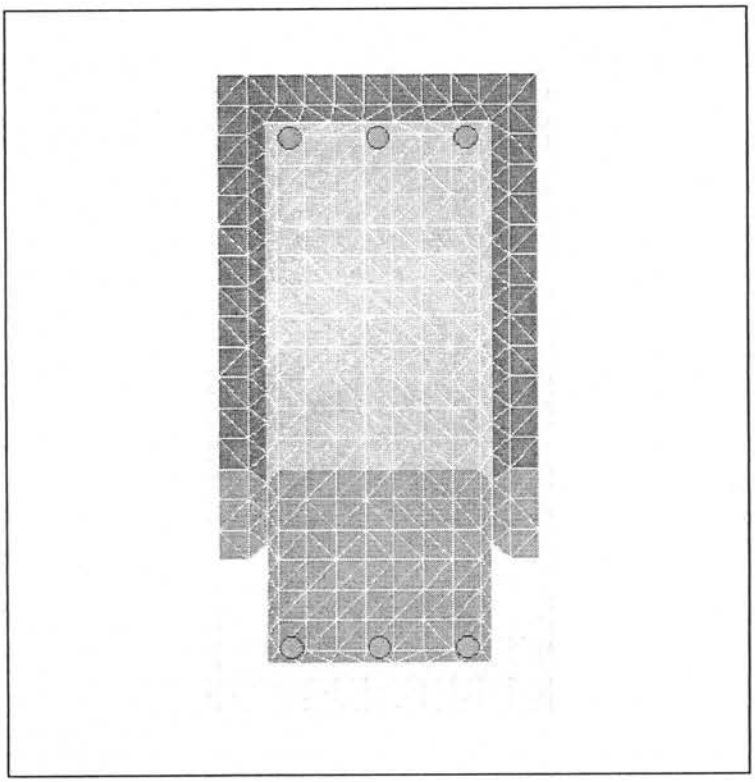
X Centroid:	-.6204E-17 m
Y Centroid:	-.1279E-16 m
Section Area:	85.52E-3 m^2

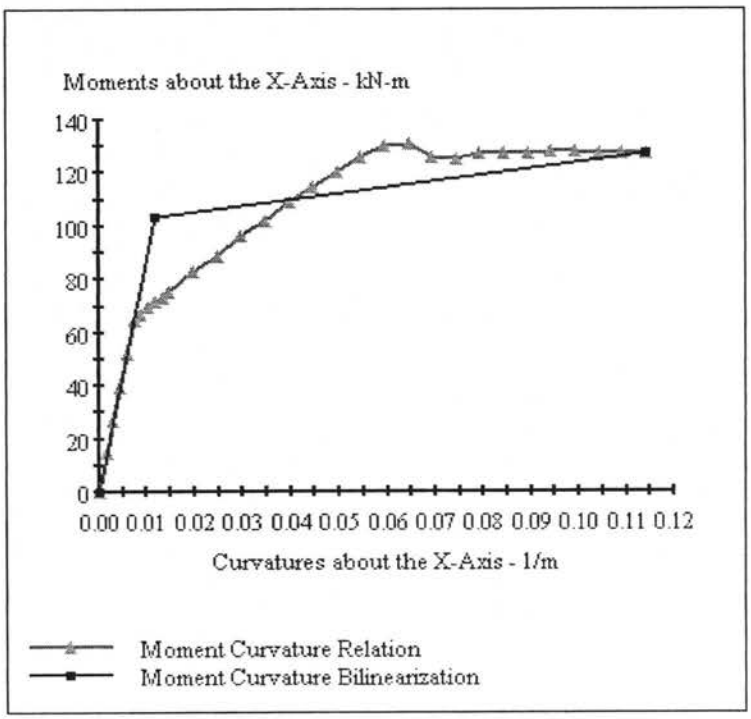
Loading Details:

Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	G60FRP
Failure Strain:	28.00E-3 Tension
Curvature at Initial Load:	0 1/m
Curvature at First Yield:	7.337E-3 1/m
Ultimate Curvature:	.1140 1/m
Moment at First Yield:	64.19 kN-m
Ultimate Moment:	127.3 kN-m
Centroid Strain at Yield:	.7261E-3 Tension
Centroid Strain at Ultimate:	5.707E-3 Tension
N.A. at First Yield:	98.97E-3 m
N.A. at Ultimate:	50.05E-3 m
Energy per Length:	12.41 kN
Effective Yield Curvature:	11.84E-3 1/m
Effective Yield Moment:	103.6 kN-m
Over Strength Factor:	1.229
Plastic Rotation Capacity:	23.55E-3 rad
EI Effective:	8.748E+6 N-m^2
Yield EI Effective:	232.6E+3 N-m^2
Bilinear Harding Slope:	2.659 %
Curvature Ductility:	9.632





XTRACT Analysis Report -

For use only in an academic or research setting.

Section Name: G60NoComp

Loading Name: mphi

Analysis Type: Moment Curvature

caz
RCLab ntua

23/5/2005

Oasp beam

oasp beam NEAK - MBAR

Myy (kN-m)	Kxx (1/m)
0	0
3.895E-3	1.474E-3
1.841E-3	2.949E-3
8.028E-3	4.423E-3
10.91E-3	5.897E-3
12.46E-3	7.372E-3
16.36E-3	8.846E-3
20.24E-3	10.32E-3
20.85E-3	11.79E-3
23.12E-3	13.27E-3
18.11E-3	14.74E-3
21.07E-3	19.71E-3
27.08E-3	24.67E-3
30.82E-3	29.63E-3
34.40E-3	34.60E-3
37.07E-3	39.56E-3
39.42E-3	44.52E-3
41.41E-3	49.49E-3
42.42E-3	54.45E-3
40.33E-3	59.42E-3
25.20E-3	64.38E-3
21.04E-3	69.34E-3
-14.33E-3	74.31E-3
-18.95E-3	79.27E-3
-18.34E-3	84.23E-3
-34.17E-3	89.20E-3
-31.20E-3	94.16E-3
-16.72E-3	99.12E-3
4.413E-3	.1041
49.79E-3	.1091
40.52E-3	.1140