APPENDIX E

RECTANGULAR BEAM SUMMARIES- STRAND A (0.6 IN)

BEAM NAME: RA-4-6-1 END: NORTH DATE: 08/12/2005

TEST PARAMETERS	
Concrete Compressive Strength	7050 psi
Embedment Length(L _e)	88 in.
Span	192 in.
Failure Mode	Flexure
Maximum Load	25.8 kips
Maximum Moment	1084 kip-in
Deflection @ Failure	3.0 in.
Rebound after complete unloading	2.6 in.
Average Transfer Length (L _t) @ release	33.4 in.
@ time of testing	41.8 in.
Average NASP P.O value for strand 0.6 in. "A"	[18.29 kips

TEST SUMMARY

Load was applied in approximately 1.0 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point till failure deflection increments were set to 0.1 in.

First flexural crack was observed at 13.4 kips at deflection of 0.5 in. First flexural cracking occurred as five cracks symmetrically located about the midpoint.

At 21.1 kips (deflection = 1.5 in.) cracks were audible. At 25.4 kips (deflection = 2.5 in.) a sudden inclined flexural cracks was observed at Stn. 38. Also at this load and deflection first end slip of 0.005 in. was noted.

Concrete crushing failure occurred at the load of 25.8 kips (deflection = 3.0 in.). End-slip at failure was 0.01 in. at the North end. End-slip at the South end remained 0.00 in.

Cracking pattern included 15 cracks in the middle 90 in. span with average crack spacing of 6.4 in. Distance between the first flexural crack and the inclined flexural crack was 15 in.





Cracking pattern for Beam RA-4-6-1 being loaded at North end

BEAM NAME: RA-4-6-1 END: SOUTH DATE: 08/12/2005

TEST PARAMETERS	
Concrete Compressive Strength	7050 psi
Embedment Length(L _e)	70 in.
Span	156 in.
Failure Mode	Flexure
Maximum Load	29.2 kips
Maximum Moment	964 kip-in
Deflection @ Failure	2.7 in.
Rebound after complete unloading	1.8 in.
Average Transfer Length (L _t) @ release	23.5 in.
@ time of testing	28.9 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point till failure deflection increments were set to 0.1 in.

Since the embedment lengths were 88 in. for the North end and 70 in. for the South end, a portion of the loading region overlapped for the North and South end testing. As a result flexural cracks already existed below the loading region for the South end test. First flexural crack could not be recorded at particular loads as the pre-existing cracks grew in width instead of formation of new cracks. At 22.0 kips (deflection = 1.3 in.) first new crack was observed towards the South side of the beam.



Photo taken before starting the loading cycle for the South end.

With further increments of loads, concrete started spalling from the crushed zone (formed during North end testing).

At 29.2 kips (deflection = 2.7 in.) a sudden jerk was noticed and on observation of the east strand it was evident that one of the strand wires had broken.

As the moment at this point was almost (99.89%) of M_n , the failure was declared to be flexural failure.

No inclined flexural crack was noticed. Cracking pattern included flexural cracks with average spacing of 6.8 in. End slip remained 0.00 at both ends throughout the loading and unloading cycle.





Cracking pattern for Beam RA-6-5-1 being loaded at South end

BEAM NAME: RA-4-6-2 END: NORTH DATE: 08/15/2005

TEST PARAMETERS	
Concrete Compressive Strength	7050 psi
Embedment Length(L _e)	73 in.
Span	162 in.
Failure Mode	Flexure
Maximum Load	29.3 kips
Maximum Moment	1011 kip-in
Deflection @ Failure	2.4 in.
Rebound after complete unloading	1.9 in.
Average Transfer Length (L _t) @ release	30.2 in.
@ time of testing	37.7 in.
Average NASP P.O value for strand 0.6 in. "A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point till failure deflection increments were set to 0.1 in.

First flexural crack was observed at 14.2 kips at deflection of 0.3 in. First flexural cracks were formed in a pair located symmetrically about the midpoint.

At the load of 21.8 kips (deflection = 0.9 in.) a sudden inclined flexural crack was observed at Stn. 40, along with the first end-slip of 0.007 in. End slip at the other end remains 0.000 in.

Cracks became audible at 24.2 kips (deflection = 1.3 in.) and the inclined flexural crack was observed to widen with increasing increments.

Concrete crushing failure was observed at 29.4 kips (deflection = 2.4 in.) with loud cracking sound.

Cracking pattern includes 11 cracks within the middle 62 in. span with average crack spacing of 6.2 in. The inclined flexural crack originated at Stn. 40 and it bifurcated to touch the bottom surface at Stn. 36. Distance of the first flexural crack and the inclined flexural crack was 17 in. Width of the inclined flexural crack at the deflection of 2.6 in was $1/4^{\text{th}}$ in.





Cracking pattern for Beam RA-4-6-2 being loaded at North end

BEAM NAME: RA-4-6-2 END: SOUTH DATE: 08/15/2005

TEST PARAMETERS	
Concrete Compressive Strength	7050 psi
Embedment Length(L _e)	58 in.
Span	148 in.
Failure Mode	Bond
Maximum Load	34.1 kips
Maximum Moment	921 kip-in
Rebound after complete unloading	2.0 in.
Average Transfer Length (L _t) @ release	29.3 in.
@ time of testing	33.2 in.
Average NASP P.O value for strand 0.6 in. "A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 18.8 kips at deflection of 0.4 in.

At 31.2 kips (deflection = 1.4 in.) first end-slip of 0.01 in. was noticed. End-slip at the North end remained 0.000 in.

As the load reached 33.4 kips (deflection = 1.7 in.) concrete which was already crushed during the North end testing suddenly gave jerk and fell out. This previously crushed zone was outside the constant moment region for the South end testing. Load decreased to 32 kips and gradually increased with further increments. At 34.1 kips (deflection = 2.0 in.) concrete outside the constant moment region towards the South side showed a few cracks.

The first flexural crack had a few more cracks moving outwards in diagonal directions giving it an appearance as of an inclined flexural crack. This crack was formed at 45 in. At deflection of 3.0 in. the width of this crack was $\frac{1}{2}$ in. No concrete crushing failure was observed in the constant moment region.



Photo showing the first flexural crack later developed as an inclined flexural crack.





Cracking pattern for Bea m RA-4-6-2 being loaded at South end

BEAM NAME: RA-6-6-1 END: NORTH DATE: 08/18/2005

TEST PARAMETERS	
Concrete Compressive Strength	8040 psi
Embedment Length(L _e)	88 in.
Span	192 in.
Failure Mode	Flexure
Maximum Load	24.1 kips
Maximum Moment	1012.2 kip-in
Deflection @ Failure	2.5 in.
Maximum deflection attained	5.5 in.
Rebound after complete unloading	3.0 in.
Average Transfer Length (L _t) @ release	29.7 in.
@ time of testing	40.9 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 13.7 kips at deflection of 0.5 in. First flexural cracks were formed as two pairs of cracks located symmetrically about the midpoint.

Cracks became audible at the load of 23.1kips at the deflection of 2.0 in.

Concrete crushing failure was observed at 24.1 kips (deflection = 2.5 in.) with concrete between the two point loads spalling off. Deflection was continued to increase till the total deflection reached 5.5 in.

End-slip reading at both the ends remained 0.000 in. throughout the loading and unloading cycles.

Cracking pattern shows 13 cracks in the middle 90 in. span with the average crack spacing of 7.5 in. No inclined flexural crack was observed. Crack width of the central crack was $\frac{1}{2}$ in.



(For the above graph intermediate points for unloading curve could not be noted)



Cracking pattern for Beam RA-6-6-1 being loaded at North end

BEAM NAME: RA-6-6-2 END: NORTH DATE: 08/18/2005

TEST PARAMETERS	
Concrete Compressive Strength	8040 psi
Embedment Length(L _e)	73 in.
Span	162 in.
Failure Mode	Flexure
Maximum Load	29.0 kips
Maximum Moment	1001 kip-in
Deflection @ Failure	2.1 in.
Maximum deflection attained	2.7 in.
Rebound after complete unloading	2.3 in.
Average Transfer Length (L _t) @ release	31.7 in.
@ time of testing	52.2 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 15.1 kips at deflection of 0.4 in. First flexural cracks were observed as two pairs located symmetrically about the midpoint plus one crack at the approximately midpoint.

As the load reached 21.7 kips (0.9 in deflection) a sudden inclined flexural crack was observed with a jerk at Stn. 36. No end-slip was noticed at this load and deflection. First end-slip of 0.01 in. was observed at 26.2 kips. (deflection = 1.4 in.). End-slip at the South end remained at 0.000 in.

The first flexural crack from the North end showed another crack growing horizontally towards the North end approximately 3in. from the bottom surface.

Concrete crushing failure was observed at 29.1 kips (deflection = 2.1in.). End slip at this load and deflection was 0.02 in.

Cracking pattern included 10 cracks in the middle 71 in. span with the average crack spacing of 7.9 in. Distance between the first flexural crack and inclined flexural crack was 19 in. Inclined flexural crack was located at Stn. 36.Maximum end-slip at deflection of 2.7 in was 0.03 in.





Cracking pattern for Beam RA-6-6-2 being loaded at North end

BEAM NAME: RA-6-6-2 END: NORTH DATE: 08/19/2005

TEST PARAMETERS	
Concrete Compressive Strength	8040 psi
Embedment Length(L _e)	58 in.
Span	148 in.
Failure Mode	Bond
Maximum Load	33.8 kips
Maximum Moment	912.6 kip-in
Deflection @ Failure	2.1 in.
Rebound after complete unloading	1.7 in.
Average Transfer Length (L _t) @ release	30.1 in.
@ time of testing	49.4 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 2.0 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 20.2 kips at deflection of 0.5 in. First flexural cracks were formed as a pair of cracks located symmetrically about the midpoint.

As the load reached 20.4 kips (0.6 in deflection), a sudden inclined flexural crack was observed at Stn. 38. First end-slip of 0.01 in. was noticed at 23.4 kips (deflection = 0.8 in.)

More flexural cracks continued to form at further increments in the flexural zone even after an inclined flexural crack was formed in the shear zone. Cracking became audible at 27 kips (deflection = 1.2 in.).

Inclined flexural crack started widening considerably after load of 27.9 kips (deflection = 1.3 in.). At 30.0 kips (deflection = 1.6 in.) a crack parallel to the inclined flexural crack was observed at a distance approximately 1.5 in from the inclined flexural crack.

Maximum load reached was 33.8 kips. (at deflection = 2.1 in.; end slip = 0.16 in.). At this load and deflection it was noticed that the first flexural crack after the inclined flexural crack grew in width. Deflection increments were continued up to total deflection of 2.7 in.

At 31.2 kips (deflection of 2.5 in.) a brief halt of approximately 10 minutes was taken for some laboratory adjustments. Maximum end-slip noted at deflection of 2.7 in. was 0.41 in.

Cracking pattern included 10 cracks in the middle 54 in. span with average crack spacing of 6in. Inclined flexural crack first formed at Stn. 38 bifurcated to touch the bottom surface at Stn. 31. Crushing of concrete was evident outside of the constant moment region.





Concrete crushing observed outside the constant moment region.



Cracking pattern for Beam RA-6-6-2 being loaded at South end

BEAM NAME: RA-6-6-3 END: NORTH DATE: 08/24/2005

TEST PARAMETERS	
Concrete Compressive Strength	8040 psi
Embedment Length(L _e)	88 in.
Span	192 in.
Failure Mode	Flexure
Maximum Load	24.9 kips
Maximum Moment	1046 kip-in
Deflection @ Failure	2.6 in.
Maximum deflection attained	4.0 in.
Rebound after complete unloading	2.8 in.
Average Transfer Length (L _t) @ release	25.8 in.
@ time of testing	45.0 in.
Average NASP P.O value for strand 0.6in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 13.3 kips at deflection of 0.5 in. The first flexural cracks were formed in the form of two pairs located symmetrically about the midpoint.

Concrete crushing failure was observed at 24.9 kips (deflection = 2.6 in.) at the top surface of concrete in the constant moment region.

End-slip values throughout the loading and unloading cycles remained at 0.000 in.

Cracking pattern included 15 cracks in the middle 101 in. span with average crack spacing of 7.2 in. No inclined flexural crack was observed. The first flexural crack was observed at Stn. 50.





Cracking pattern for Beam RA-6-6-3 being loaded at North end

BEAM NAME: RA-8-6-1 END: NORTH DATE: 08/19/2005

TEST PARAMETERS	
Concrete Compressive Strength	8040 psi
Embedment Length(L _e)	88 in.
Span	208 in.
Failure Mode	Flexure
Maximum Load	24.0 kips
Maximum Moment	1008 kip-in
Deflection @ Failure	2.4 in.
Maximum defletion attained	3.5 in.
Rebound after complete unloading	2.7 in.
Average Transfer Length (L _t) @ release	28.2 in.
@ time of testing	45.5 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.0 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 13.4 kips at deflection of 0.6 in. First flexural cracks were formed as three pairs of cracks located symmetrically about the midpoint.

No significant changes were observed till the load reached 24.0 kips (deflection = 2.4 in.) where concrete crushing failure was observed at the top surface. Crushed concrete zone lied in the constant moment region. End-slip at failure remained 0.00 in.

No inclined flexural crack was observed. The cracking pattern included 11 cracks in the middle 82 in. span with average crack spacing of 8.2 in. The first flexural crack was located at Stn. 59.

Maximum deflection attained was 3.5 in. and end-slip throughout the loading and unloading cycle remained 0.00 in at both ends.





Cracking pattern for Beam RA-8-6-1 being loaded at North end

BEAM NAME: RA-8-6-2 END: NORTH DATE: 08/22/2005

TEST PARAMETERS	
Concrete Compressive Strength	8220 psi
Embedment Length(L _e)	73 in.
Span	162 in.
Failure Mode	Flexure
Maximum Load	29.2 kips
Maximum Moment	1007 kip-in
Deflection @ Failure	2.0 in.
Maximum Deflection attained	2.8 in.
Rebound after complete unloading	2.2 in.
Average Transfer Length (L _t) @ release	28.2 in.
@ time of testing	46.4 in.
Average NASP P.O value for strand 0.6in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 16.4 kips at deflection of 0.4 in. First flexural cracks were noticed in the form of two pairs of cracks located symmetrically about the midpoint and in addition a central crack located approximately at the midpoint.

Cracks became audible at the load of 23 kips (deflection = 0.9 in.).

At 25 kips (deflection = 1.2 in.) a sudden inclined flexural crack was noticed at Stn. 38. First end-slip of 0.01 in. was observed at 28.2 kips (deflection = 1.7 in.). Another crack was visible along the side of the inclined flexural crack at approx. 1.5 in from the inclined flexural crack at 28.9 kips (deflection = 1.9 in.)

Concrete crushing failure was identified at the load of 29.2 kips (deflection = 2.0 in.) with the top surface of concrete crushed in the constant moment region. End-slip at failure was 0.01 in.

Cracking pattern included 11 cracks in the middle 73 in span with average crack spacing of 7.3 in. Inclined flexural crack was at Stn. 38, with the lower end bifurcated without touching the bottom surface approx. 3 in from bottom. End-slip at the south end remained



0.000 in. throughout the loading and unloading cycles. Maximum end-slip at the deflection of 2.8 in was 0.02 in.



Cracking pattern for Beam RA-8-6-2 being loaded at North end

BEAM NAME: RA-8-6-2 END: SOUTH DATE: 08/22/2005

TEST PARAMETERS	
Concrete Compressive Strength	8220 psi
Embedment Length(L _e)	58 in.
Span	132 in.
Failure Mode	Bond
Maximum Load	36.6 kips
Maximum Moment	988 kip-in
Deflection @ Failure	2.5 in.
Rebound after complete unloading	2.2 in.
Average Transfer Length (L _t) @ release	25.7 in.
@ time of testing	42.4 in.
Average NASP P.O value for strand 0.6 in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 21.2 kips at deflection of 0.6 in. First flexural cracks were noticed in the form of four pairs of cracks with cracks at the North side rising from the pre-existing cracks formed during the North end testing.

At 25.1 kips (deflection = 0.9 in.) a sudden inclined flexural crack was observed at Stn. 31 with a loud noise. First end-slip of 0.1 in was observed at 26.4 kips (deflection = 1.0 in.)

A second inclined flexural crack was formed at Stn. 18 but did not touch the bottom surface of the beam. This crack started from the topmost point of the first inclined flexural crack and then went on to propagate diagonally downwards.

Crushing of concrete was observed at 36.6 kips (deflection = 2.5 in.) At this point the moment was almost equal but slightly less (988 kip-in) than the nominal moment (989 kip-in). The failure was thus declared to be a bond failure. End-slip reading at this point was 0.12 in.

Cracking pattern included 6 cracks in the 27 in. span towards the South end with average crack spacing of 5.4 in. Maximum end-slip at the deflection of 2.9 in. was 0.15 in.



End-slip at the North end remained 0.000 in throughout the loading and unloading cycle.



Cracking pattern for Beam RA-8-6-2 being loaded at South end

BEAM NAME: RA-10-6-1 END: NORTH DATE: 08/24/2005

TEST PARAMETERS	
Concrete Compressive Strength	14610 psi
Embedment Length(L _e)	88 in.
Span	192 in.
Failure Mode	Flexure
Maximum Load	25.8 kips
Maximum Moment	1084 kip-in
Deflection @ Failure	2.8 in.
Maximum defletion attained	5.0 in.
Rebound after complete unloading	2.8 in.
Average Transfer Length (L _t) @ release	20.0 in.
@ time of testing	30.0 in.
Average NASP P.O value for strand 0.6in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.0 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 14.9 kips at deflection of 0.5 in. First flexural cracks were formed in the form of two pairs of cracks located symmetrically about the midpoint in addition to the central crack.

A secondary crack was formed between the second and third crack towards the North side from the central crack at the load of 19.0 kips (deflection = 0.9 in.)

Concrete crushing failure was observed at 25.8 kips (deflection = 2.8 in.) at the top surface of concrete within the constant moment region. The deflection increments were continued till the total deflection reached 5.0 in.

End-slip at both ends remained 0.00 in. throughout the loading and unloading cycles.

Cracking pattern included 13 cracks in the middle 84 in. span with the average crack spacing of 7 in. No inclined flexural crack was observed. The first flexural crack was located at the St. 59.





Cracking pattern for Beam RA-10-6-1 being loaded at North end

BEAM NAME: RA-10-6-2 END: NORTH DATE: 08/24/2005

TEST PARAMETERS	
Concrete Compressive Strength	14610 psi
Embedment Length(L _e)	73 in.
Span	162 in.
Failure Mode	Flexure
Maximum Load	31.0 kips
Maximum Moment	1070 kip-in
Deflection @ Failure	1.8 in.
Maximum deflection attained	2.5 in.
Rebound after complete unloading	2.0 in.
Average Transfer Length (L _t) @ release	15.6 in.
@ time of testing	26.8 in.
Average NASP P.O value for strand 0.6in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 1.5 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 18.6 kips at deflection of 0.4 in. First flexural cracks were formed in the form of a pair with one central crack.

No significant changes were noticed till the load reached 31.0 kips (deflection = 2.5 in.) when concrete crushing failure was observed at the top surface of concrete in the constant moment region.

End-slip values remained 0.000 in. at both ends throughout the loading and unloading cycles.

Cracking pattern included 9 cracks in the middle 70 in. span with the average crack spacing of 8.8 in. The first flexural crack was observed at Stn. 49. No inclined flexural crack was observed.





Cracking pattern for Beam RA-10-6-2 being loaded at North end

BEAM NAME: RA-10-6-2 END: SOUTH DATE: 08/24/2005

TEST PARAMETERS	
Concrete Compressive Strength	14610 psi
Embedment Length(L _e)	58 in.
Span	148 in.
Failure Mode	Flexure
Maximum Load	40.1 kips
Maximum Moment	1083 kip-in
Deflection @ Failure	2.4 in.
Rebound after complete unloading	2.2 in.
Average Transfer Length (L _t) @ release	21.8 in.
@ time of testing	30.7 in.
Average NASP P.O value for strand 0.6in."A"	18.29 kips

TEST SUMMARY

Load was applied in approximately 2.0 kips increments till first flexural cracking. Beyond this point the deflection was incremented by 0.03 in. till total deflection reached 1.00 in. Further increments of deflection were kept 0.05 in. up to 2.0 in. From this point deflection increments were set to 0.1 in.

First flexural crack was observed at 22.3 kips at deflection of 0.5 in. First flexural cracks were formed in the form of two pairs of cracks located symmetrically about the midpoint.

At the load of 25.6 kips (deflection = 0.7 in.), a secondary crack was discovered at approximately the midpoint of the span.

Concrete crushing failure was observed with loud noise at the top surface of concrete in the constant moment region at 40.1 kips (deflection = 2.4 in.).

End-slip at all loads remained 0.00 in. at both ends.

Cracking pattern included 9 cracks in the middle 73 in. span with the average crack spacing of 9 in. No inclined flexural crack was noticed. First flexural crack was located at Stn. 41.



Cracking pattern for Beam RA-10-6-2 being loaded at South end