U.S. Department
of Transportation

Federal Highway Administration

400 Seventh St., S.W.
Washington, D.C. 20590

May 28, 1998

Refer to: HNG-14

J. M. Essex, P.E.
Senior Vice President, Sales
Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601

Dear Mr. Essex:

In your April 21 letter to Mr. Henry Rentz, you requested acceptance of the REGENT as a National Cooperative Highway Research Program (NCHRP) Report 350 test level 3 (TL-3) flared, gating end terminal for strong post w-beam barrier. To support your request for acceptance of the REGENT at TL-3, you also sent copies of an undated report entitled "Engineering Report for the REGENT System," which included the full report prepared by E-TECH Testing Services, Inc., entitled "NCHRP Report 350 Crash Test Results for the REGENT System," dated April 1998, and a video tape showing the full scale tests that you conducted on the REGENT. Mr. Owen S. Denman, President of E-Tech Testing Services, Inc., has also provided Messrs. Powers and Hatton of my staff with corrections to your report and additional information on the REGENT, including information on an additional length-of-need test run on the terminal. Most recently, Mr. Denman submitted, on May 26, a replacement report dated May 1998 that incorporates and corrects all the previously supplied information on the REGENT system. In addition, he supplied a new video tape showing all the tests covered in the report. He also supplied still photographs of the most recent test run on the REGENT system.

The REGENT is a flared w-beam terminal consisting of a slider head assembly, a cable anchor/strut and yoke assembly, modified w-beam rail panels, and special weakened wood posts (REGENT posts 1 and 2, and eight REGENT line posts). Enclosure 1 shows the installation layout and salient details of the final design. The REGENT is a gating terminal with its length of need beginning at post 3, approximately 3800 mm from the nose of the terminal which is offset 1303 mm from the barrier itself. The post offsets correspond to those specified in the Breakaway Cable Terminal (BCT) that was developed in the late 1970's, but the REGENT uses more posts to minimize deflection and they are unique. To ensure consistent performance, the REGENT line posts are 150 mm x 200 mm x 1829 mm wooden posts with two parallel 63.5-mm diameter holes at ground line. These posts must be select structural grade 300 mm above and below the weakening holes and #2 grade elsewhere.

The modified rail elements are partially crushed at two locations to produce "upsets" designed to induce predictable kinks in the rail in end-on hits while maintaining most of its bending strength to minimize deflection for side impacts.

The NCHRP Report 350 recommends up to seven tests for a gating, redirective terminal. We agreed beforehand that for a terminal like the REGENT, angle impacts on the nose would be less severe than end-on impacts, so tests 3-32 and 3-33 could be waived. We also agreed that the reverse direction hit (test 3-39) would not be required based on the similarity of the REGENT to other terminals on which this tests has been run with acceptable results. Enclosure 2 consists of summary reports for the tests that you conducted. We noted that the NCHRP Report 350 test 3-35 was run twice on the REGENT, once with it connected to a w-beam guardrail supported on wooden line posts with wooden blockouts and once connected to a w-beam guardrail mounted on steel line posts with routed wooden blockouts. The REGENT demonstrated acceptable performance in both of these tests.

Based on our review of the information you and Mr. Denman have provided, we find that the REGENT System, as tested, meets the acceptance criteria for an NCHRP Report 350 TL-3 terminal and is acceptable for use on the National Highway System (NHS) if requested by a transportation agency. Because it is a proprietary device, its use on Federal-aid projects, except exempt, non-NHS projects, is subject to the conditions listed in Title 23, Code of Federal Regulations, Section 635.411, when such use is specified by the contracting authority.

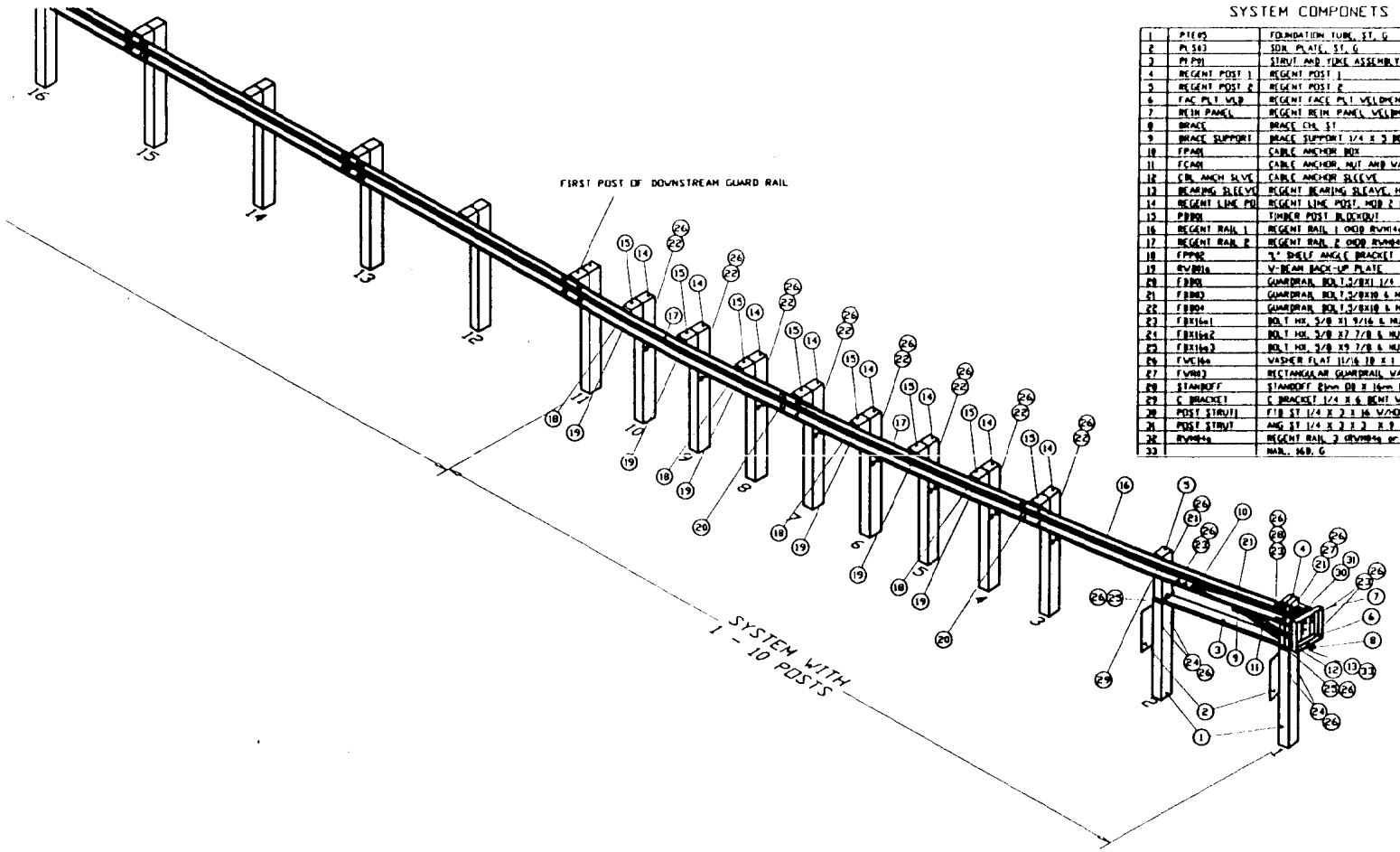
Sincerely yours,

Dwight A. Horne

Dwight A. Horne
Chief, Federal-Aid and Design Division

2 Enclosures

Federal Highway Administration
HNG-14:JHatton:366-1320:5-28-98:jh:ESSEX
copies to:
HNG-1 HNG-10 HNG-14 Reader, 3128
Reader, 3128 RAs HFL-1 HHS-10 HSR-20 HNG-20



PARTS LIST

ITEM	STOCK NO.	DESCRIPTION

SYSTEM COMPONETS

1	PTE02	FOUNDATION TUBE, ST, G	2.00
2	PLS03	SOIL PLATE, ST, G	2.00
3	PTP01	STRUT AND YOKE ASSEMBLY, ST, G	1.00
4	REGENT POST 1	REGENT POST 1	1.00
5	REGENT POST 2	REGENT POST 2	1.00
6	FAC PLT WLD	REGENT FACE PLT WELDMENT	1.00
7	REIN PANEL	REGENT REIN PANEL WELDMENT	1.00
8	BRACE	BRACE CHL ST	1.00
9	BRACE SUPPORT	BRACE SUPPORT 1/4 X 3 BENT W/HOLES	1.00
10	FPA01	CABLE ANCHOR BOX	1.00
11	FCA01	CABLE ANCHOR, NUT AND WASHERS	1.00
12	CBL ANCH SLVE	CABLE ANCHOR SLEEVE	1.00
13	BEARING SLEEVE	REGENT BEARING SLEAVE, HALF	2.00
14	REGENT LINK PST	REGENT LINK POST, MOD 2 1/2" HOLES	8.00
15	PBB01	TIMBER POST BLOCKOUT	8.00
16	REGENT RAIL 1	REGENT RAIL 1 (MOD RVM14a)	1.00
17	REGENT RAIL 2	REGENT RAIL 2 (MOD RVM14a)	1.00
18	FPP02	3" SHELF ANGLE BRACKET	4.00
19	RVB01a	V-BEAM BACK-UP PLATE	6.00
20	FBB01	GUARDRAIL BOLT,5/8X1 1/4 & RAILNUT	26.00
21	FBB02	GUARDRAIL BOLT,5/8X10 & NUT,HXH	2.00
22	FBB04	GUARDRAIL BOLT,5/8X10 & NUT,HXH	8.00
23	FBX16a1	BOLT HX, 5/8 X1 9/16 & NUT,HX	21.00
24	FBX16a2	BOLT HX, 5/8 X7 7/8 & NUT,HX	4.00
25	FBX16a3	BOLT HX, 5/8 X9 7/8 & NUT,HX	2.00
26	FWC16a	WASHER FLAT 11/16 ID X 1 3/4 OD, G	52.00
27	FWR01	RECTANGULAR GUARDRAIL WASHER	2.00
28	STANDOFF	STANDOFF 81mm OD X 16mm ID X 7mm	9.00
29	C BRACKET	C BRACKET 1/4 X 6 BENT W/HOLE	1.00
30	POST STRUT1	FLB ST 1/4 X 2 X 16 W/HOLES	1.00
31	POST STRUT	ANG ST 1/4 X 2 X 2 X 9 W/HOLE	1.00
32	RVM14a	REGENT RAIL 2 (RVM14a or RVM16a)	1.00
33		NAIL, 16D, G	2.00

DESIGNED: JBW	DATE: 4/20/98
NEXT ASSY	
SCALE: 1=1	
TOLERANCES: a. Angular ± 1° b. Linear ± 2mm (UNLESS OTHERWISE NOTED)	

REGENT SYSTEM
ISO VIEW W/ PARTS LIST

SIZE	RS 1	REV	A

1 of 1

A-1

C-1

MATERIALS

PARTS LIST

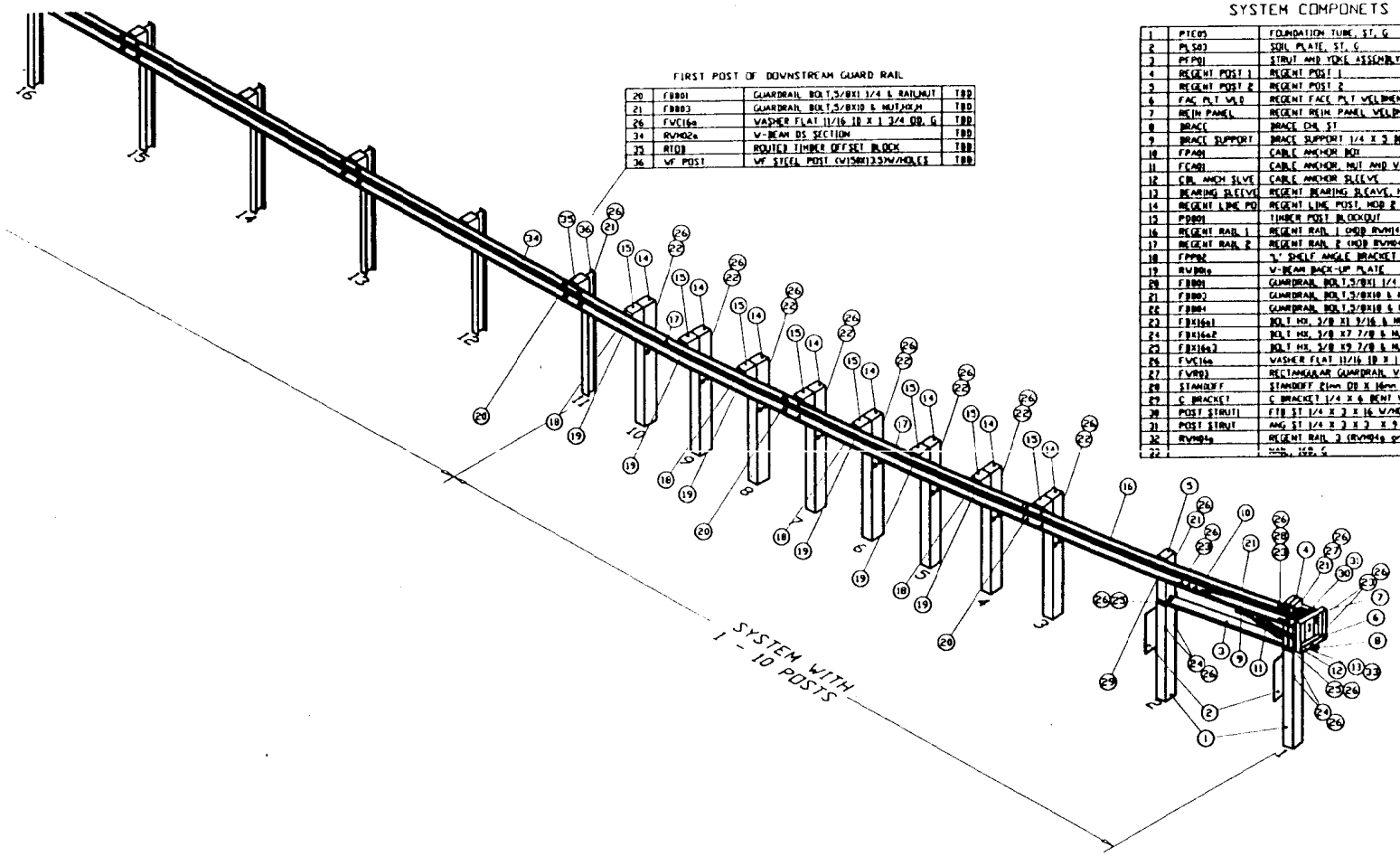
ITEM	STOCK NO	DESCRIPTION	REQ

SYSTEM COMPONETS

1	PTE01	FOUNDATION TUBE, ST, G	2.00
2	PLS03	SOIL PLATE, ST, G	2.00
3	PTP01	STRUT AND YOKE ASSEMBLY, ST, G	1.00
4	REGENT POST 1	REGENT POST 1	1.00
5	REGENT POST 2	REGENT POST 2	1.00
6	FAC PLT WLD	REGENT FACE PLT WELDMENT	1.00
7	REIN PANEL	REGENT REIN PANEL WELDMENT	1.00
8	BRACE	BRACE CHL ST	1.00
9	BRACE SUPPORT	BRACE SUPPORT 1/4 X 3 BENT W/HOLES	1.00
10	FPA01	CABLE ANCHOR BOX	1.00
11	FCA01	CABLE ANCHOR NUT AND WASHERS	1.00
12	CBL ANCH SLVE	CABLE ANCHOR SLEEVE	1.00
13	BEARING SLEEVE	REGENT BEARING SLEAVE, HALF	2.00
14	REGENT LINE PO	REGENT LINE POST, HDR 2 1/2" HOLES	8.00
15	PBB01	TIMBER POST BLOCKOUT	8.00
16	REGENT RAIL 1	REGENT RAIL 1 (HDR RVM14a)	1.00
17	REGENT RAIL 2	REGENT RAIL 2 (HDR RVM04a)	1.00
18	FPP02	3" SHELF ANGLE BRACKET	4.00
19	RVM04a	W-BEAM BACK-UP PLATE	6.00
20	FBB01	GUARDRAIL BOLT,5/8X1 1/4 & RAILNUT	26.00
21	FBB02	GUARDRAIL BOLT,5/8X10 & NUT,HX,H	2.00
22	FBB04	GUARDRAIL BOLT,5/8X10 & NUT,HX,H	8.00
23	FBX16a1	BOLT HX, 5/8 X1 9/16 & NUT,HX	21.00
24	FBX16a2	BOLT HX, 5/8 X7 7/8 & NUT,HX	4.00
25	FBX16a3	BOLT HX, 5/8 X9 7/8 & NUT,HX	2.00
26	FWC16a	WASHER FLAT 11/16 ID X 1 3/4 OD, G	53.00
27	FWB01	RECTANGULAR GUARDRAIL WASHER	2.00
28	STANDOFF	STANDOFF 21mm OD X 16mm ID X 2mm	9.00
29	C BRACKET	C BRACKET 1/4 X 6 BENT W/HOLE	1.00
30	POST STRUT1	FTB ST 1/4 X 2 X 16 W/HOLES	1.00
31	POST STRUT	ANG ST 1/4 X 2 X 2 X 9 W/HOLE	1.00
32	RVM04a	REGENT RAIL 2 (RVM04a or RVM08a)	1.00
33		WASHER, HEX, G	2.00

FIRST POST OF DOWNSTREAM GUARD RAIL

20	FBB01	GUARDRAIL BOLT,5/8X1 1/4 & RAILNUT	TBD
21	FBB03	GUARDRAIL BOLT,5/8X10 & NUT,HX,H	TBD
26	FWC16a	WASHER FLAT 11/16 ID X 1 3/4 OD, G	TBD
34	RVM02a	W-BEAM DS SECTION	TBD
35	RTQ01	ROUTED TIMBER OFFSET BLOCK	TBD
36	WF POST	WF STEEL POST (W150X13.5)W/HOLES	TBD

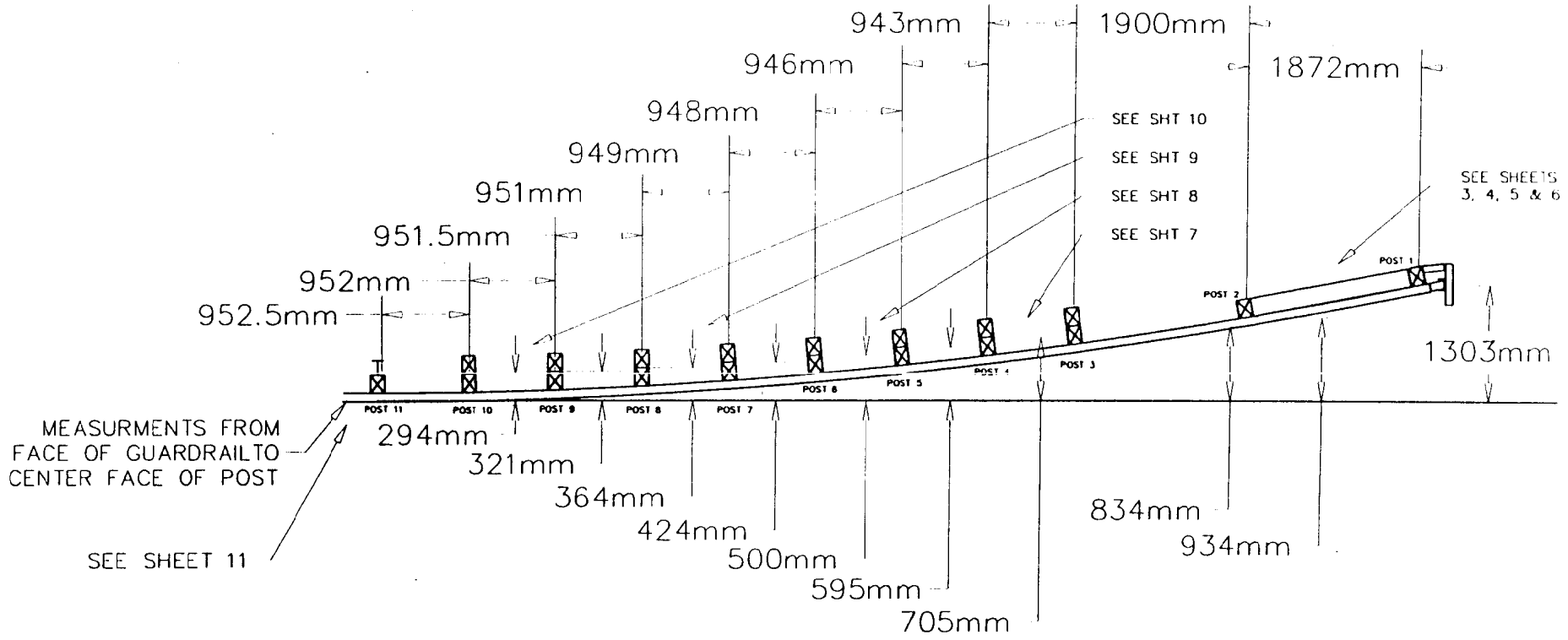


DESIGNED: JBW	DATE: 4/20/98
NEXT ASSY.	
SCALE: 1=1	
TOLERANCES: a. Angular ± 1° b. Linear ± 2mm (UNLESS OTHERWISE NOTED)	

REGENT SYSTEM ATTACHED TO GUARDRAIL WITH WF-STEEL POSTS

FILE: RS 1 WF	REV	SHEET 1 of 1

MATERIALS	PARTS LIST			
	ITEM	STOCK NO	DESCRIPTION	REQ'D



REGENT SYSTEM LAYOUT

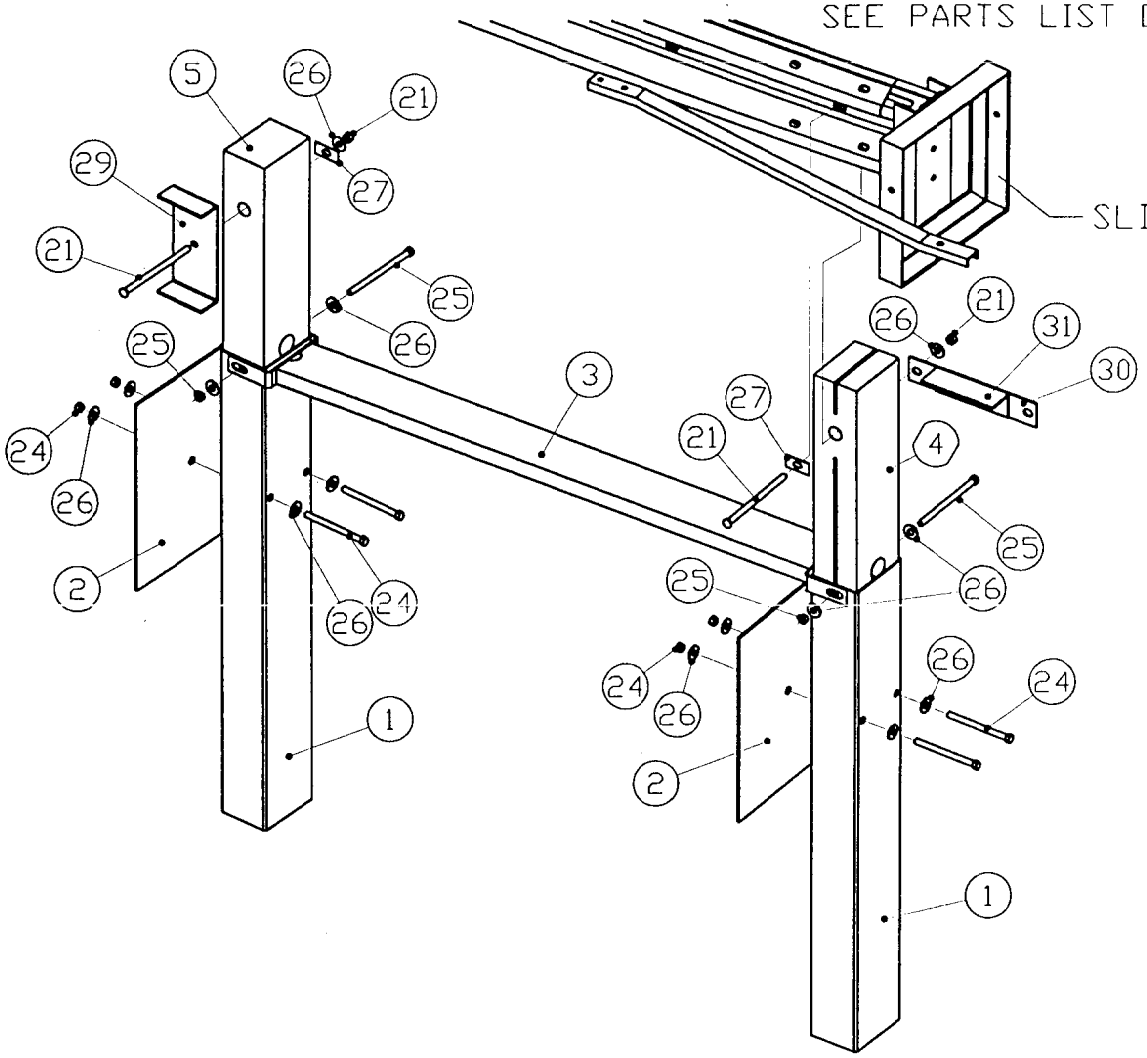
DESIGNED JBW	DATE 5/26/98	
NEXT ASSY		REGENT SYSTEM REGENT SYSTEM PLAN WF POST & TIMBER BLOCK
SCALE 1=1		
TOLERANCES a. Angular ± 1° b. Linear ± 2mm (UNLESS OTHERWISE NOTED)		SIZE RS 2 WF / REV / SHEET 2 of 12

MATERIALS:

PARTS LIST

ITEM	STOCK NO.	DESCRIPTION	REQ'D

SEE PARTS LIST ON REGENT SYSTEM DRAWING

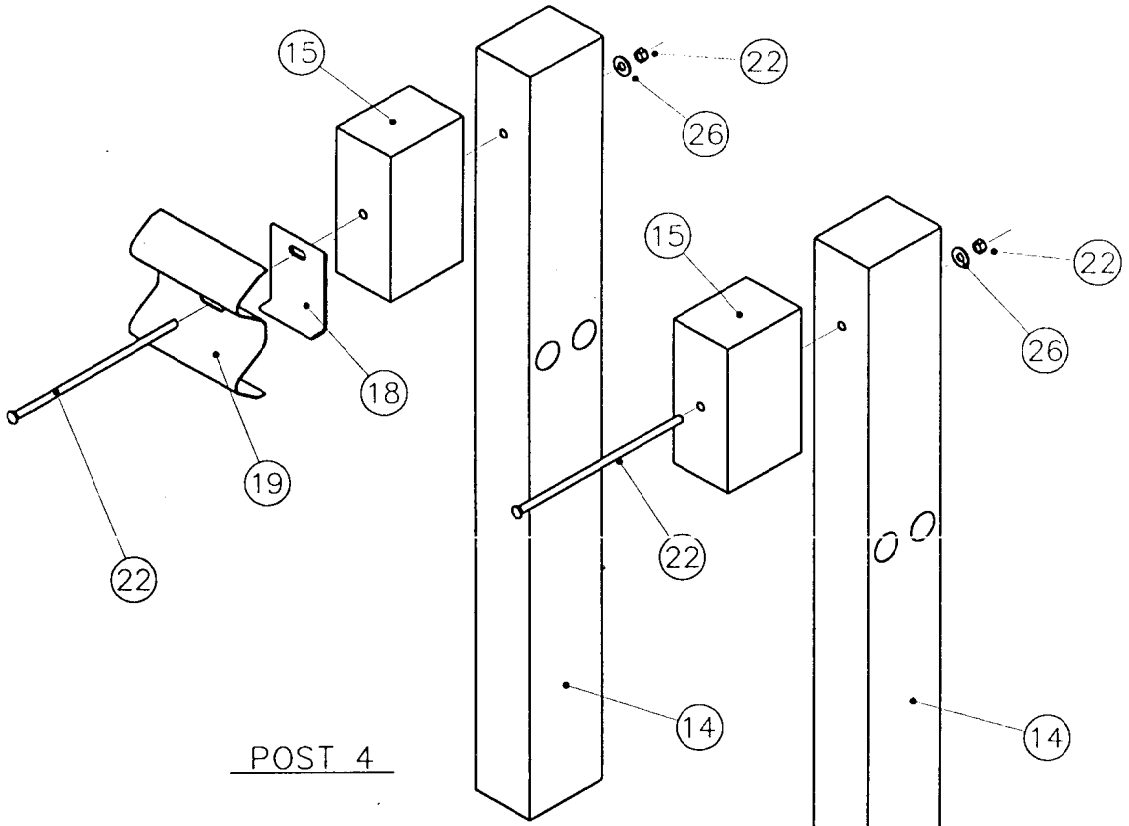


DESIGNED: JBW	DATE: 5/26/98
NEXT ASSY:	
SCALE: 1=1	
TOLERANCES: a. Angular ± 1° b. Linear ± 1/16" (UNLESS OTHERWISE NOTED)	

REGENT SYSTEM
POST 1 & 2 ASSEMBLY

TITLE: RS 5 WF	REV:	SHEET: 5 of 12

MATERIALS:	PARTS LIST			
	ITEM	STOCK NO.	DESCRIPTION	REQ'D



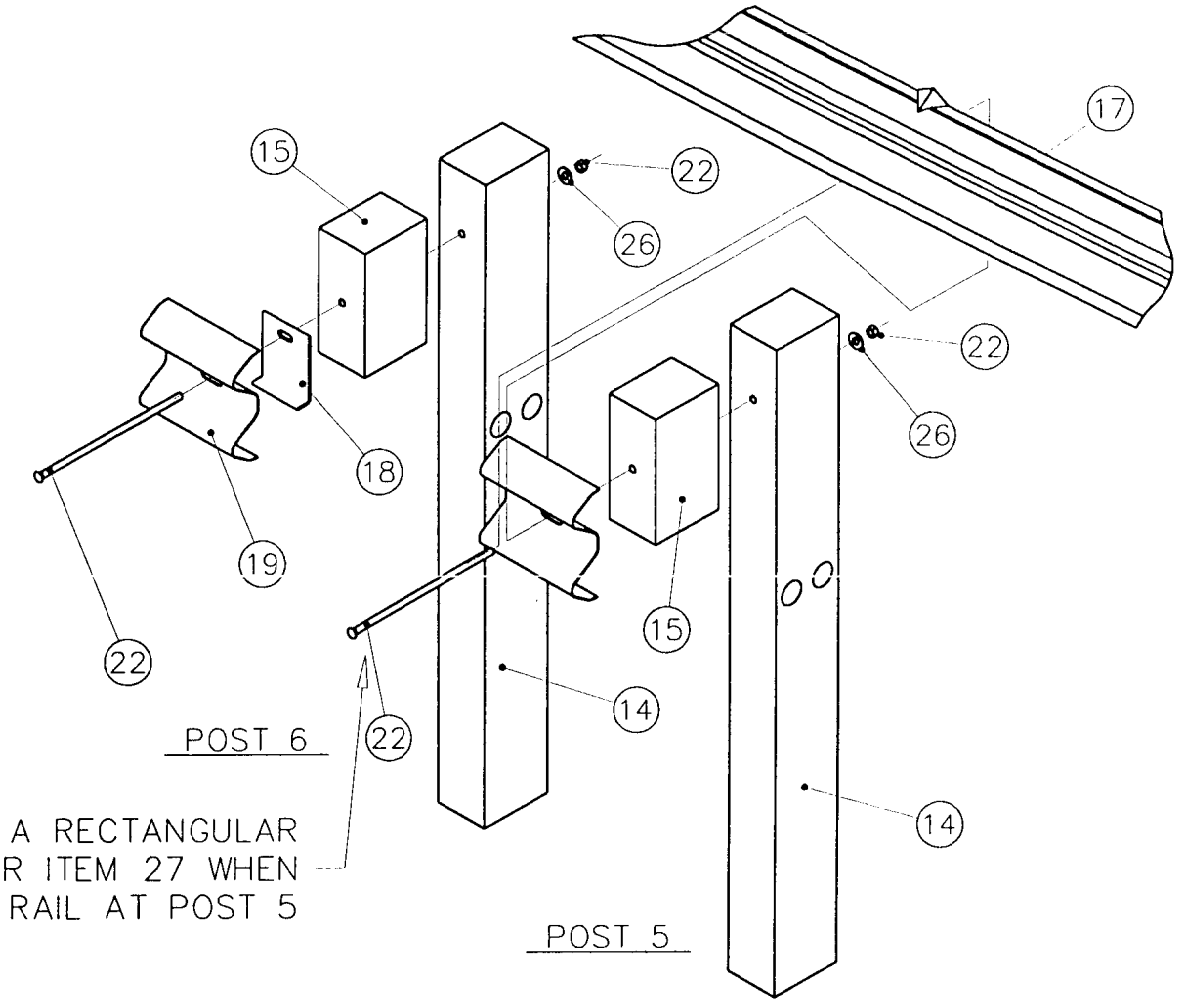
DESIGNED: JBW	DATE: 5/26/98	
NEXT ASSY		REGENT SYSTEM POST 3 & 4 ASSEMBLY
SCALE: 1=1		
TOLERANCES: a. Angular ± b. Linear ± (UNLESS OTHERWISE NOTED)		
	TITLE: RS 7 WF	REV. SHEET: 7 of 12

C-7

MATERIALS:

PARTS LIST

ITEM	STOCK NO.	DESCRIPTION	REQ'D



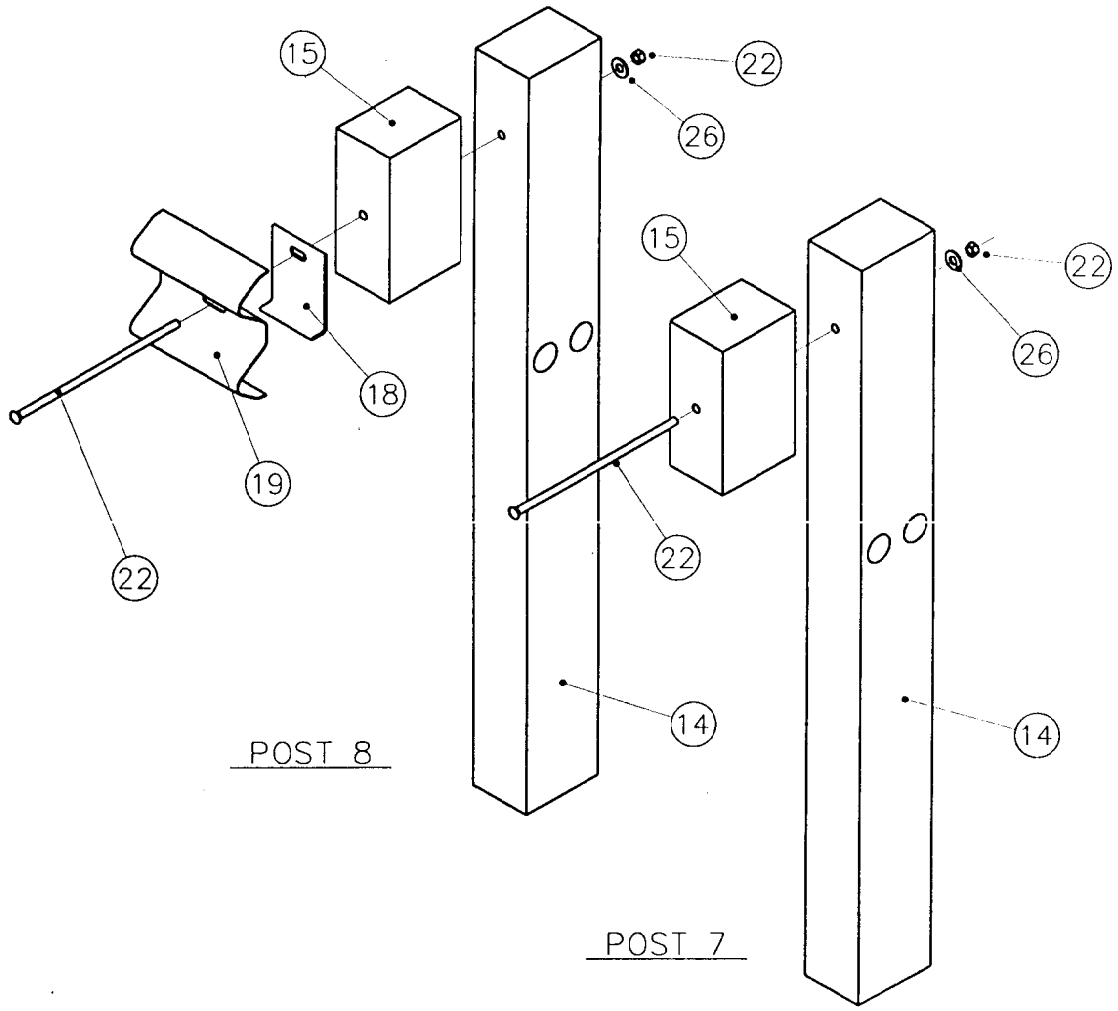
DO NOT USE A RECTANGULAR FLAT WASHER ITEM 27 WHEN ATTACHING THE RAIL AT POST 5

DESIGNED: JBW	DATE: 5/26/98	
NEXT ASSY:		REGENT SYSTEM POST 5 & 6 ASSEMBLY
SCALE: 1=1		
TOLERANCES: a. Angular ± b. Linear ± (UNLESS OTHERWISE NOTED)	FILE: RS 8 WF	REV. SHEET 8 of 12

MATERIALS:

PARTS LIST

ITEM	STOCK NO.	DESCRIPTION	REQ'D

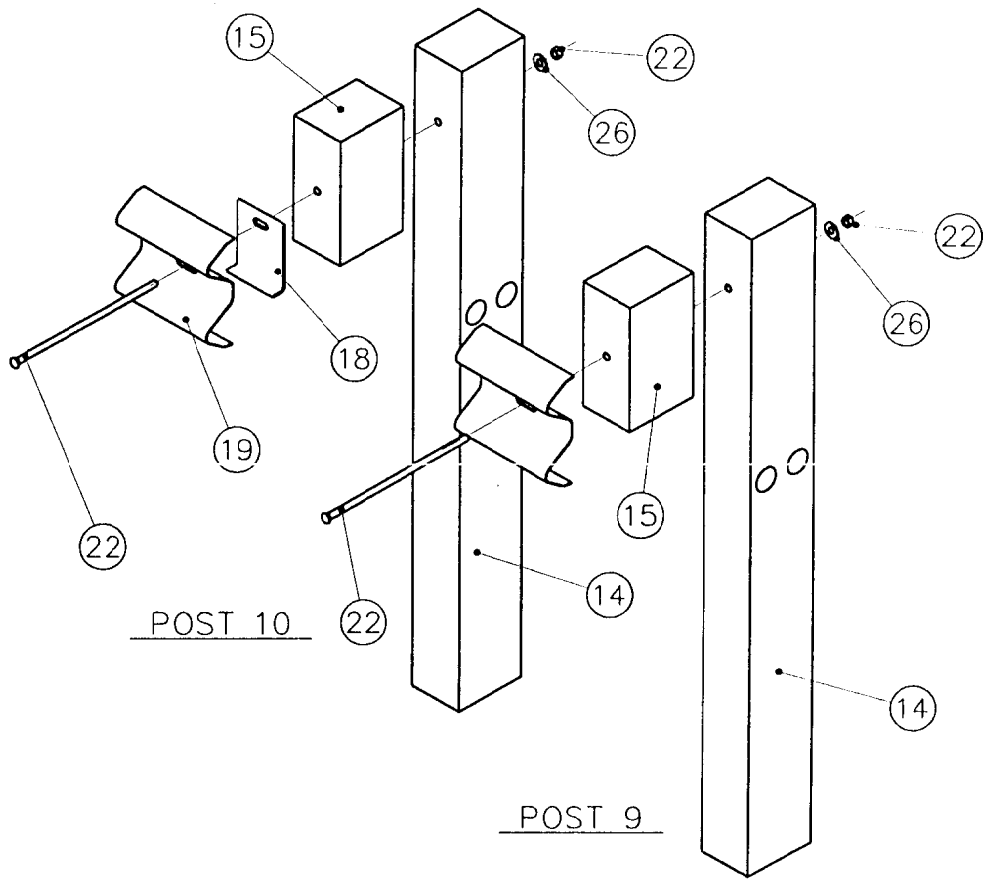


DESIGNED: JBW	DATE: 5/26/98	
NEXT ASSY:		
SCALE: 1=1		
TOLERANCES: a. Angular ± b. Linear ± (UNLESS OTHERWISE NOTED)		

REGENT SYSTEM
POST 7 & 8 ASSEMBLY

FILE: RS 9 WF	REV:	SHEET: 9 of 12

MATERIALS:	PARTS LIST			
	ITEM	STOCK NO.	DESCRIPTION	REQ'D

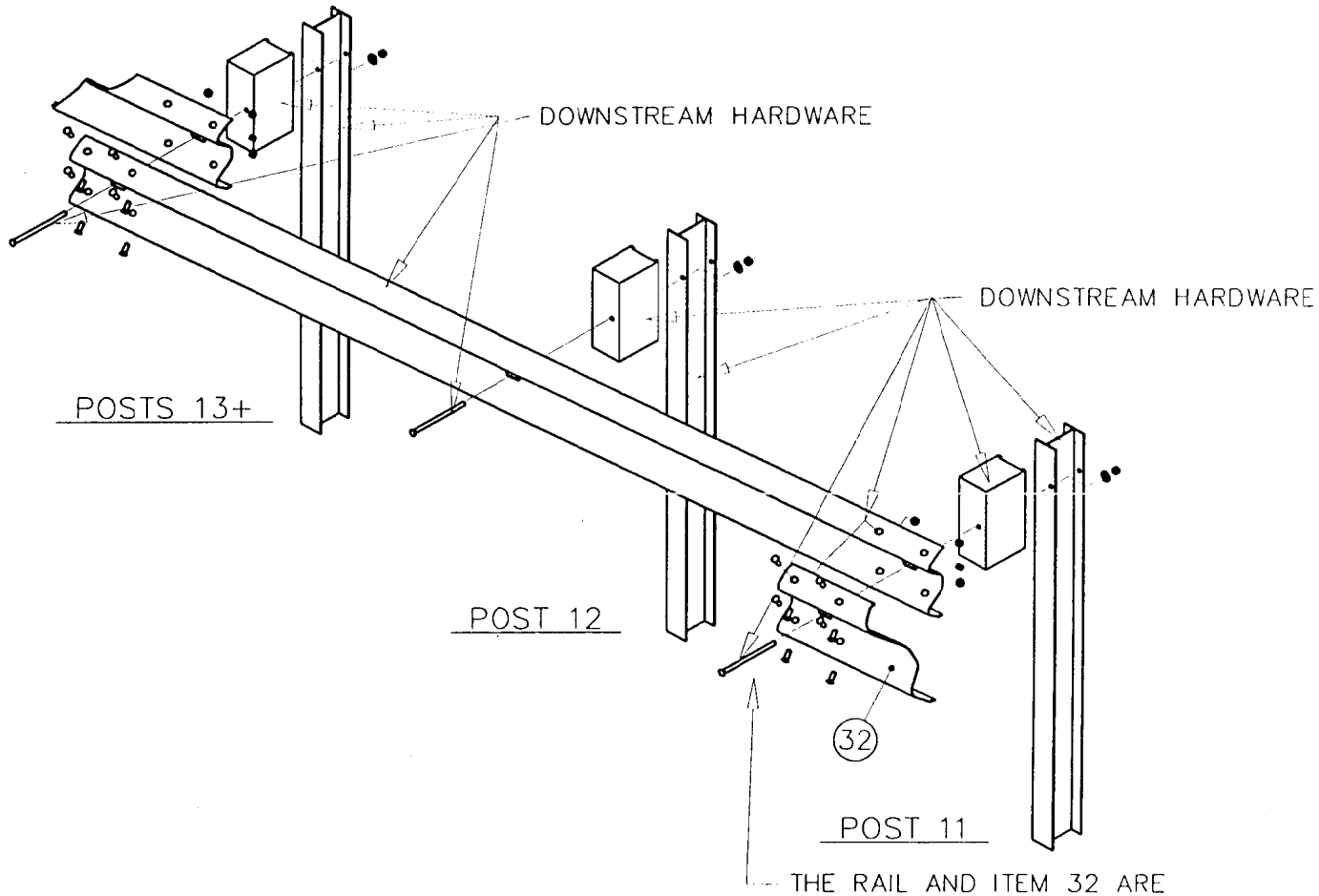


DESIGNED: JBW	DATE: 5/26/98		
NEXT ASSY:		REGENT SYSTEM POST 9 & 10 ASSEMBLY	
SCALE: 1=1			
TOLERANCES: a. Angular ± b. Linear ± (UNLESS OTHERWISE NOTED)		FILE: RS 10 WF	REV:
			SHEET: 10of12

C-10

Enclosure 1: Page 7 of 9

MATERIALS:	PARTS LIST			
	ITEM	STOCK NO.	DESCRIPTION	REQ'D

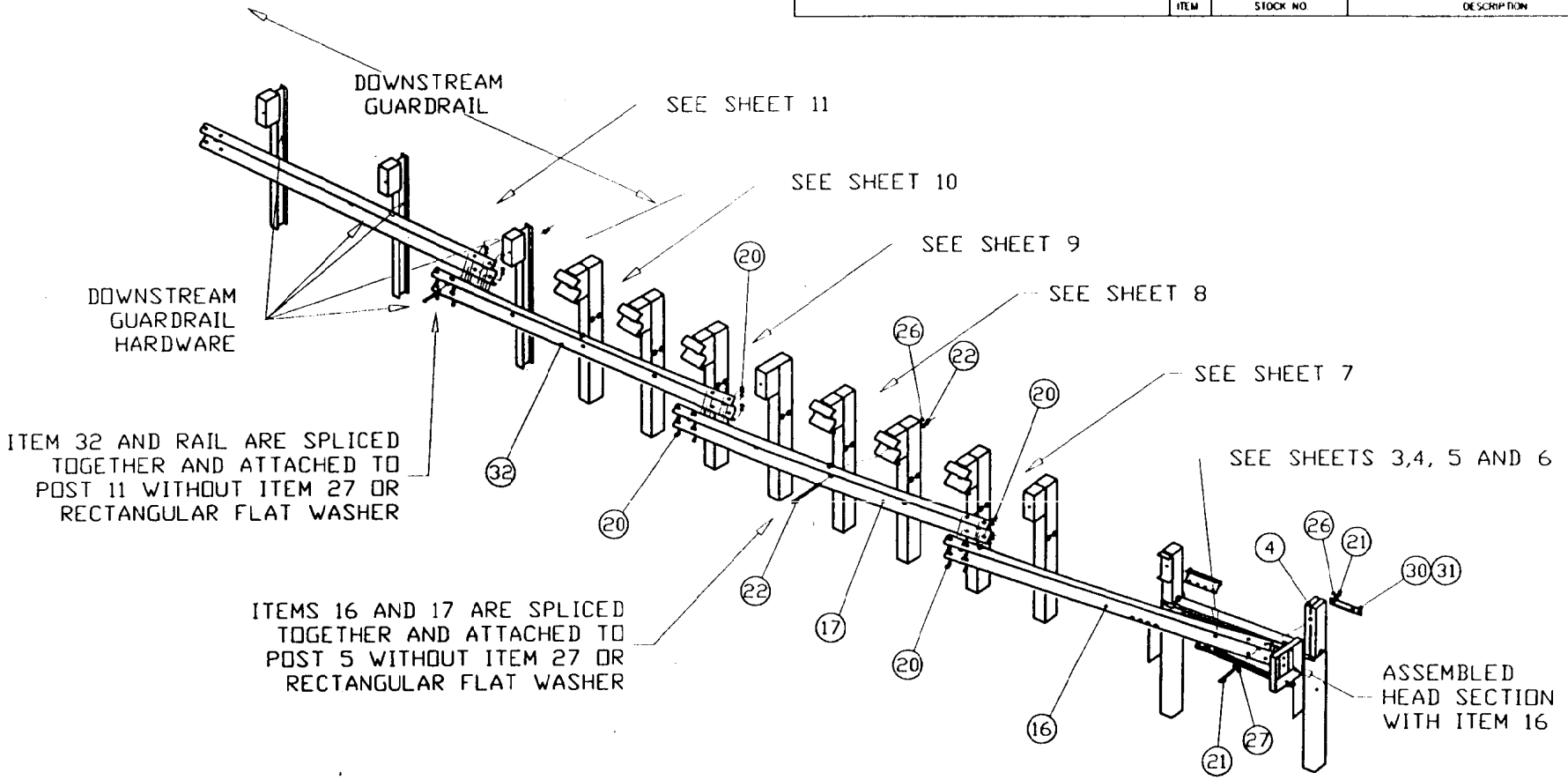


DESIGNED: JBW	DATE: 5/26/98
NEXT ASSY:	
SCALE: 1=1	
TOLERANCES: a. Angular ± b. Linear ± (UNLESS OTHERWISE NOTED)	

REGENT SYSTEM
POST 11 & DOWNSTREAM WF
POST & TIMBER BLOCKOUT ASSEM.

FILE:	REV:	SHEET:
RS 11 WF		11of12

MATERIALS	PARTS LIST			
	ITEM	STOCK NO	DESCRIPTION	REQ'D

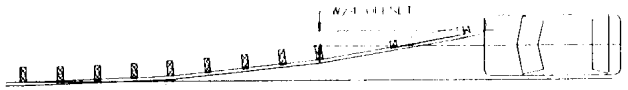
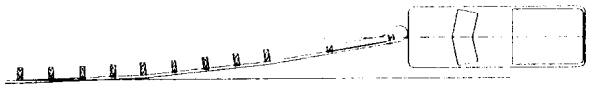
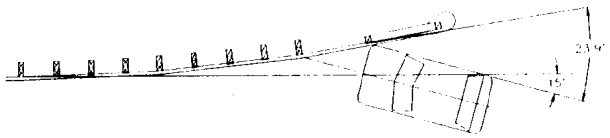
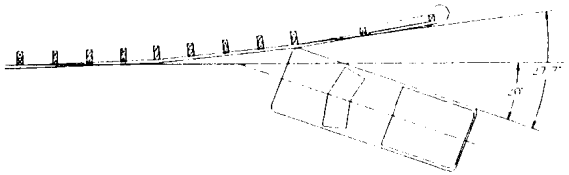
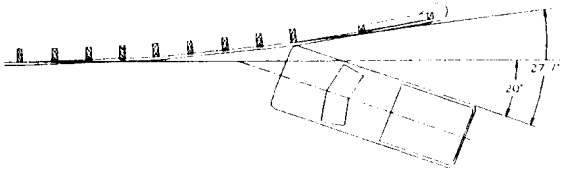


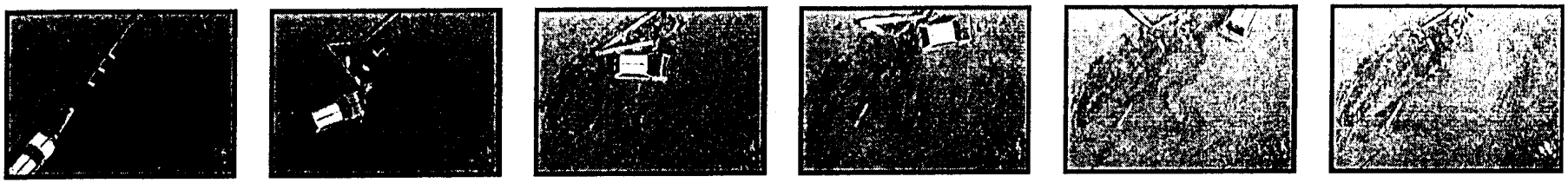
DESIGNED: JBW	DATE: 5/26/98
NEXT ASSY:	
SCALE: 1=1	
TOLERANCES: a. Angular ± 1° b. Linear ± 2mm (UNLESS OTHERWISE NOTED)	

REGENT SYSTEM
W-BEAM MOUNTING
TIMBER BLOCKOUT & W/F POST

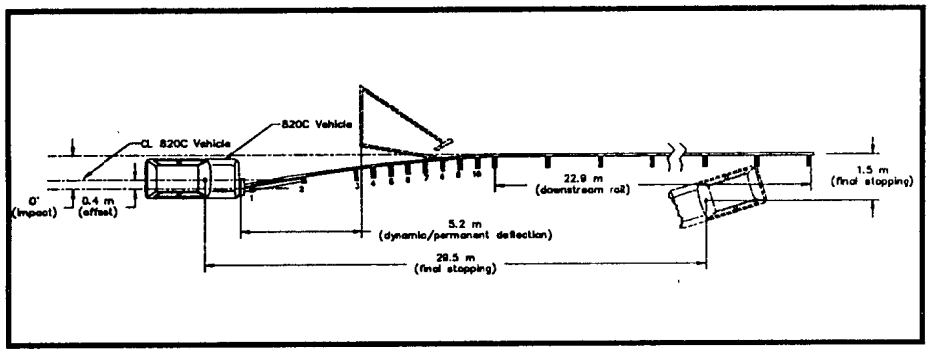
FILE	REV	SHEET
RS 12 WF		12of12

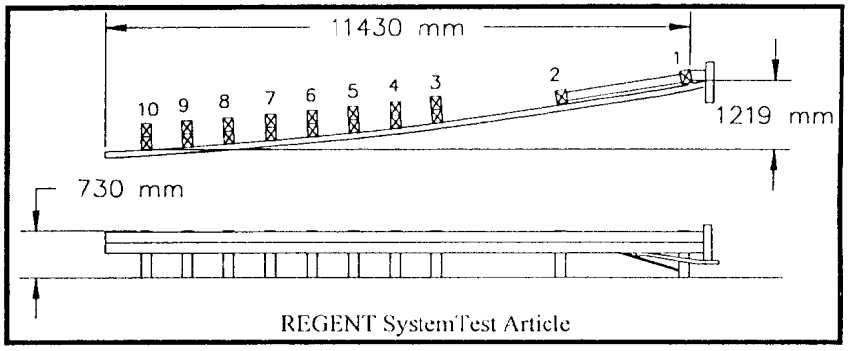
TEST MATRIX FOR CERTIFICATION OF TH[illegible]EGENT™ GUARDRAIL END TREATMENT TO NCHRP 350 TEST LEVEL 3 STANDARDS

NCHRP Evaluation Criteria	E-Tech Test ID. #	Test Conditions	Impact Speed (km/hr)	Impact Angle (deg.)	Occupant Impact Velocity		Ridedown Accelerations		Overall Assess-ment	Notes
					Long. (m/sec)	Lateral (m/sec)	Long. (G)	Lateral (G)		
350-3-30	01-7622-013		104.70	0	10.20	1.74	-9.08	-15.09	PASS	Vehicle rotated 180 degrees in a stable cond.
350-3-31	01-7622-012		98.30	0	4.15	0.17	-3.80	4.80	PASS	Vehicle gated in a stable fashion with minimal roll.
350-3-34	01-7622-003		101.10	15	4.62	5.71	-15.88	12.30	PASS	Vehicle smoothly redirected.
350-3-35	01-7622-002		97.10	20	4.69	4.14	-4.63	-9.11	PASS	Vehicle smoothly redirected.
350-3-35	01-7622-014		101.70	20	4.73	3.92	-6.91	-11.94	PASS	Vehicle smoothly redirected.



t = 0.000 sec | t = 0.090sec | t = 0.180sec | t = 0.270 sec | t = 0.360 sec | t = final





General Information

Test Agency	E-TECH Testing Services, Inc.
Test Designation	NCHRP 350 Test 3-30
Test No.	01-7622-013
Date	3/19/98

Test Article

Type	E-TECH Testing Services, Inc.
	REGENT System with
	NCHRP 350 "Weak" Soil
Installation Length	11430 mm
Size and/or dimension and material of key elements	11430 mm Terminal Length
	1219 mm Terminal Flare
	22860 mm Downstream Rail

Test Vehicle

Type	Production Model
Designation	820C
Model	1988 Ford Festiva
	Hatchback
Mass (kg)	
Curb	807.8
Test inertial	817.0
Dummy(s)	75.0
Gross Static	892.0

Impact Conditions

Speed (km/h)	104.65
Angle (deg)	0.0
Impact Severity (kJ)	345.21

Exit conditions

Speed (km/h)	N/A
Angle (deg)	N/A

Occupant Risk Values

Impact Velocity (m/s)	
x-direction	10.20
y-direction	1.74
Ridedown Acceleration (g's)	
x-direction	-9.08
y-direction	-15.09
THIV (m/s)	10.46
PHD (g's)	7.98
ASI	1.85

Test Article Deflections (m)

Dynamic	5.7
Permanent	5.7

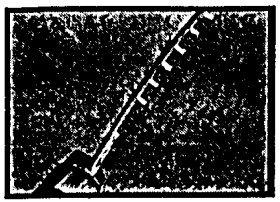
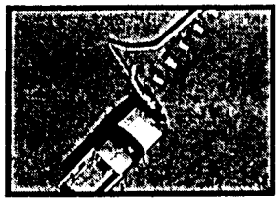
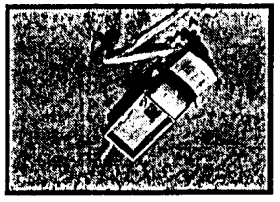
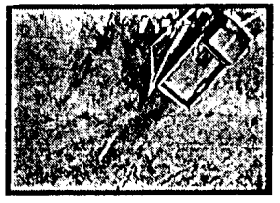
Vehicle Damage

Exterior	
VDS	FR-3
CDC	12FREW3
Interior	
OCDI	RF0010000

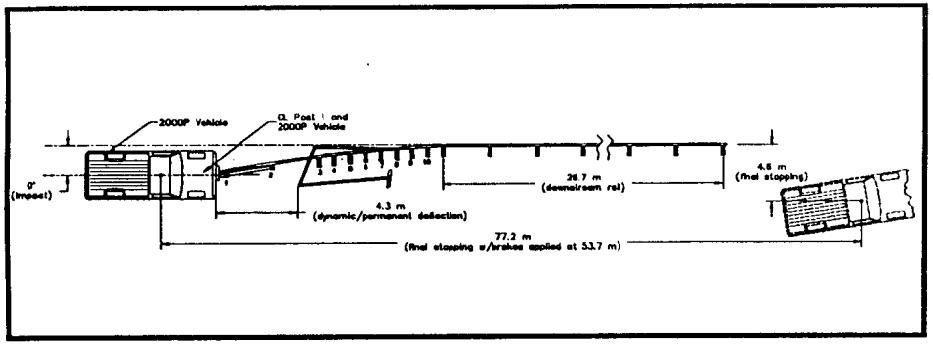
Post-Impact Vehicular Behavior (deg - gyro @ c.g.)

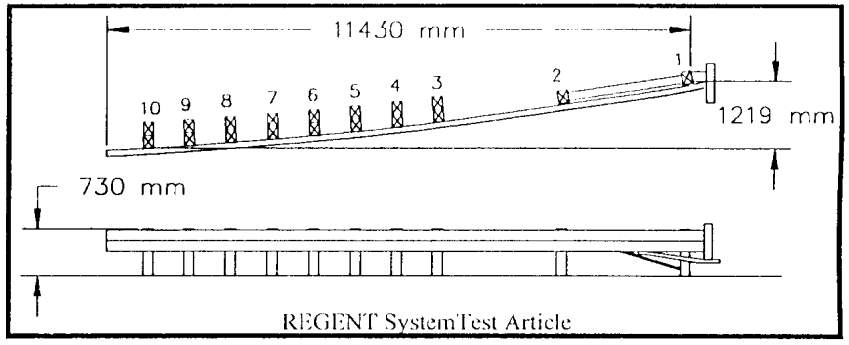
Maximum Roll Angle	-39.03
Maximum Pitch Angle	-15.68
Maximum Yaw Angle	197.72

Figure 1. Summary of Results - REGENT System Test 01-7622-013

t = 0.000 sec | t = 0.120sec | t = 0.240sec | t = 0.360 sec | t = 0.480 sec | t = final





General Information
- Test Agency ..... E-TECH Testing Services, Inc.
- Test Designation ..... NCHRP 350 Test 3-31
- Test No. 01-7622-012
- Date 4/9/98

Test Article
- Type ..... E-TECH Testing Services, Inc.
- ..... REGENT System with
- ..... NCHRP 350 "Weak" Soil
- Installation Length ..... 11430 mm
- Size and/or dimension and material of key elements ..... 11430 mm Terminal Length
- ..... 1219 mm Terminal Flare
- ..... 22860 mm Downstream Rail

Test Vehicle
- Type ..... Production Model
- Designation 2000P
- Model ..... 1988 Chevrolet C2500
- ..... 3/4T Pickup
- Mass (kg)
  - Curb 1875.6
  - Test inertial 1999.8
  - Dummy(s) ..... N/A
  - Gross Static 1999.8

Impact Conditions
- Speed (km/h) 98.32
- Angle (deg) 0.0
- Impact Severity (kJ) 745.76

Exit conditions
- Speed (km/h) ..... N/A
- Angle (deg) ..... N/A

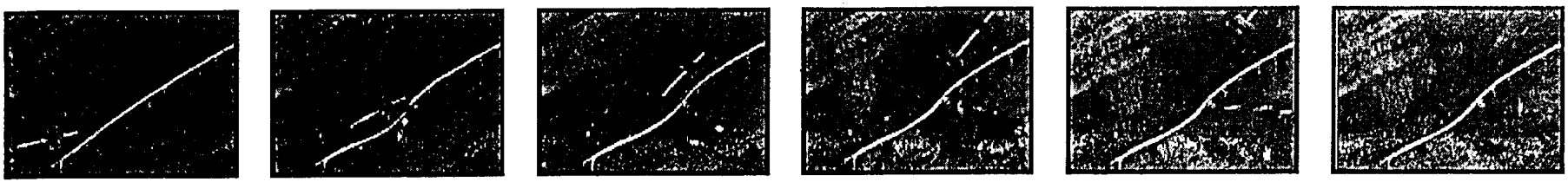
Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction 4.15
  - y-direction 0.17
- Ridedown Acceleration (g's)
  - x-direction ..... -3.80
  - y-direction 4.80
- THIV (m/s) 4.15
- PHD (g's) 3.56
- ASI 0.72

Test Article Deflections (m)
- Dynamic 4.3
- Permanent 4.3

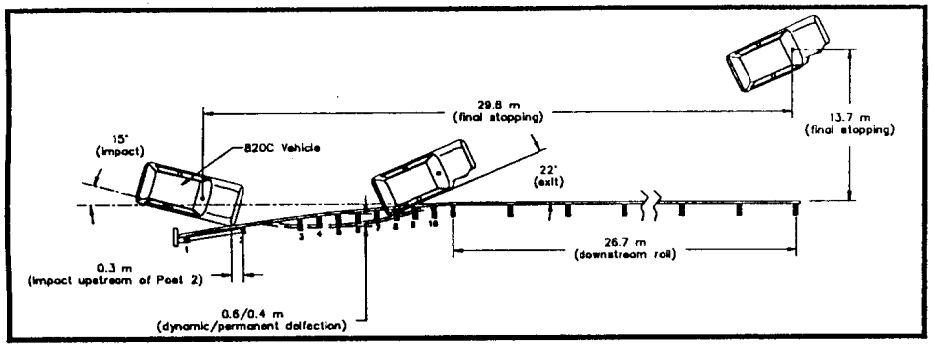
Vehicle Damage
- Exterior
  - VDS FC-3
  - CDC 12FCEW2
- Interior
  - OCDI LF0100000

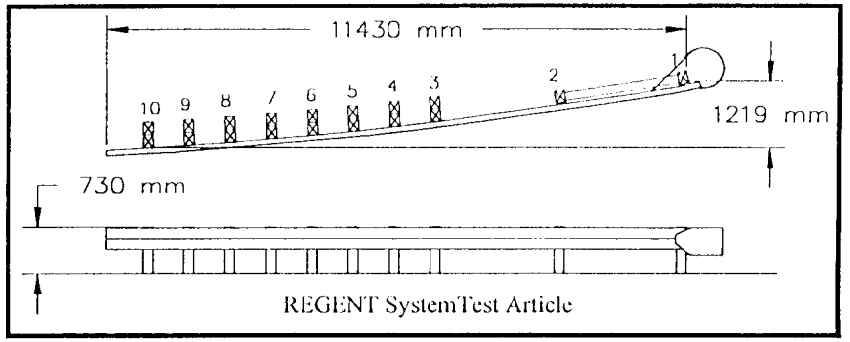
Post-Impact Vehicular Behavior (deg - gyro @ c.g.)
- Maximum Roll Angle 41.15
- Maximum Pitch Angle ..... -7.34
- Maximum Yaw Angle ..... -10.81

Figure 6. Summary of Results - REGENT System Test 01-7622-012



t = 0.000 sec | t = 0.180sec | t = 0.360sec | t = 0.540 sec | t = 0.720 sec | t = final





General Information
- Test Agency ..... E-TECH Testing Services, Inc.
- Test Designation ..... NCHRP 350 Test 3-34
- Test No. 01-7622-003
- Date 1/23/98

Test Article
- Type ..... E-TECH Testing Services, Inc.
- ..... REGENT System with
- ..... NCHRP 350 "Weak" Soil
- Installation Length ..... 11430 mm
- Size and/or dimension and material of key elements ..... 11430 mm Terminal Length
- ..... 1219 mm Terminal Flare
- ..... 26670 mm Downstream Rail

Test Vehicle
- Type ..... Production Model
- Designation 820C
- Model ..... 1989 Ford Festiva
- ..... Hatchback
- Mass (kg)
  - Curb 804.6
  - Test inertial 812.2
  - Dummy(s) 75.0
  - Gross Static 887.2

Impact Conditions
- Speed (km/h) 101.12
- Angle (deg) 15.0
- Impact Severity (kJ) 21.46

Exit conditions
- Speed (km/h) 49.32
- Angle (deg) 22.0

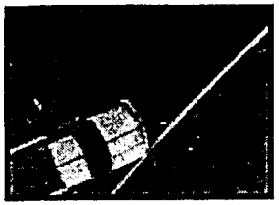
Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction 4.62
  - y-direction 5.71
- Ridedown Acceleration (g's)
  - x-direction ..... -15.88
  - y-direction 12.30
- THIV (m/s) 7.26
- PHD (g's) 14.30
- ASI 1.29

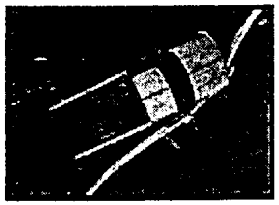
Test Article Deflections (m)
- Dynamic 0.5
- Permanent 0.5

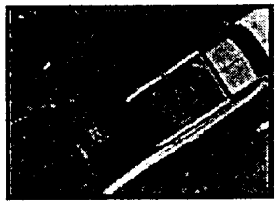
Vehicle Damage
- Exterior
  - VDS LFQ-5
  - CDC 11LDEW4
- Interior
  - OCDI AS0000000

Post-Impact Vehicular Behavior (deg - gyro @ c.g.)
- Maximum Roll Angle ..... -9.58
- Maximum Pitch Angle 1.92
- Maximum Yaw Angle ..... -44.46

Figure 11. Summary of Results - REGENT System Test 01-7622-003


t = 0.000 sec

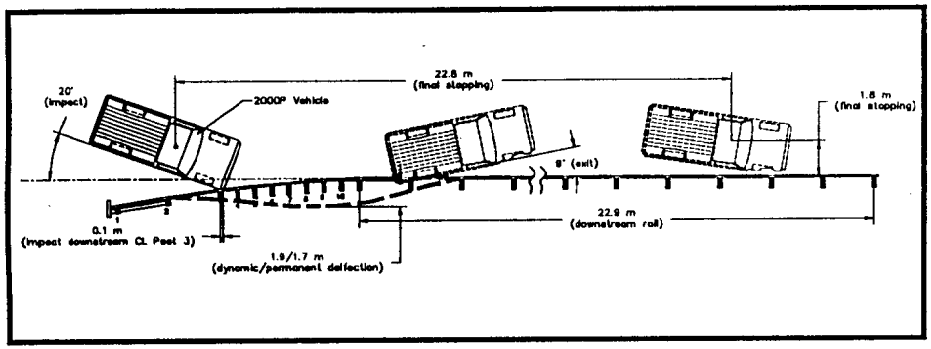

t = 0.120sec

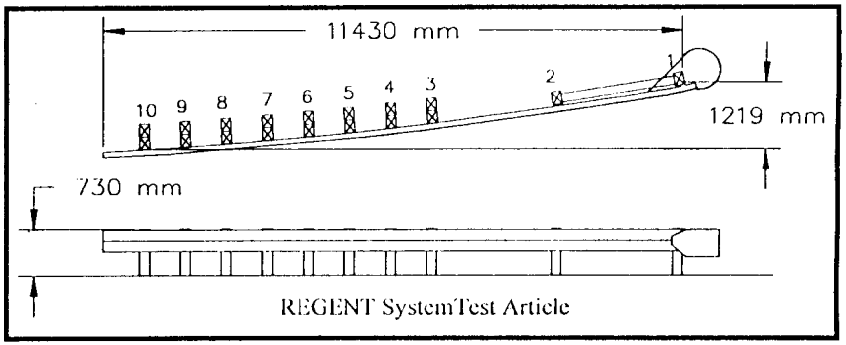

t = 0.240sec


t = 0.360 sec


t = 0.480 sec


t = final





General Information
- Test Agency ..... E-TECH Testing Services, Inc.
- Test Designation ..... NCHRP 350 Test 3-35
- Test No. 01-7622-002
- Date 1/6/98

Test Article
- Type ..... E-TECH Testing Services, Inc.
- ..... REGENT System with
- ..... NCHRP 350 "Weak" Soil
- Installation Length ..... 11430 mm
- Size and/or dimension and material of key elements ..... 11430 mm Terminal Length
- ..... 1219 mm Terminal Flare
- ..... 26670 mm Downstream Rail

Test Vehicle
- Type ..... Production Model
- Designation 2000P
- Model ..... 1988 Chevrolet C2500
- ..... 3/4T Pickup
- Mass (kg)
  - Curb 1972.2
  - Test inertial 1996.0
  - Dummy(s) ..... N/A
  - Gross Static 1996.0

Impact Conditions
- Speed (km/h) 97.08
- Angle (deg) 20.0
- Impact Severity (kJ) 84.92

Exit conditions
- Speed (km/h) 57.60
- Angle (deg) 9.0

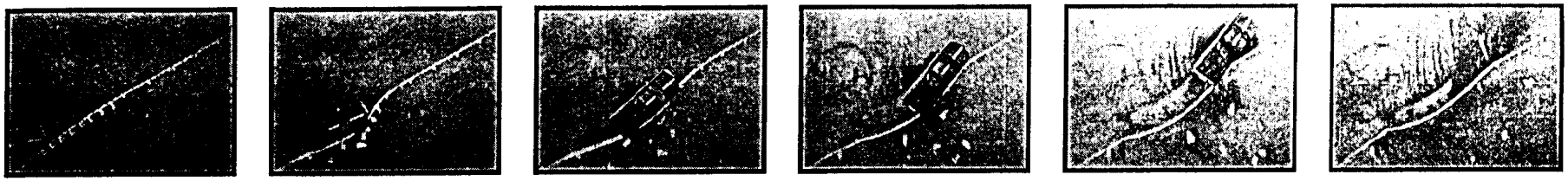
Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction 4.69
  - y-direction 4.14
- Ridedown Acceleration (g's)
  - x-direction ..... -6.43
  - y-direction ..... -9.11
- THIV (m/s) 6.48
- PHD (g's) 6.72
- ASI 0.59

Test Article Deflections (m)
- Dynamic 1.9
- Permanent 1.7

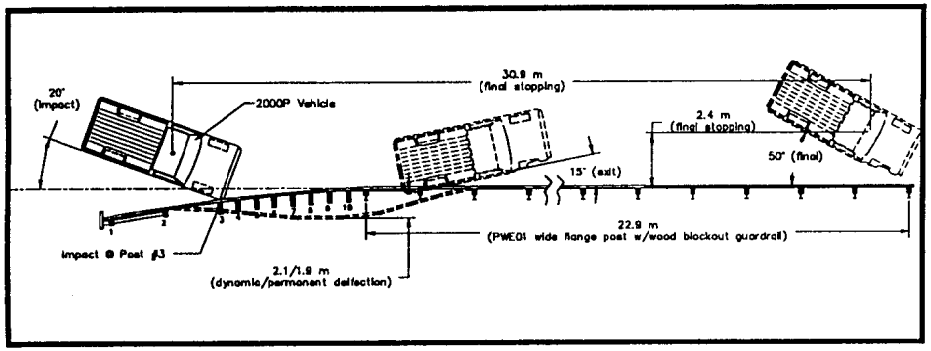
Vehicle Damage
- Exterior
  - VDS RFQ-5
  - CDC 11LDEW2
- Interior
  - OCDI LF1000000

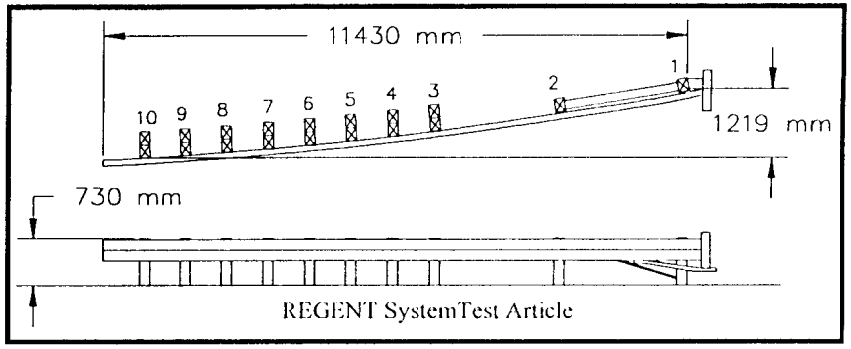
Post-Impact Vehicular Behavior (deg - gyro @ c.g.)
- Maximum Roll Angle 9.24
- Maximum Pitch Angle 5.53
- Maximum Yaw Angle ..... -30.92

Figure 16. Summary of Results - REGENT System Test 01-7622-002



t = 0.000 sec | t = 0.180sec | t = 0.360sec | t = 0.540 sec | t = 0.720 sec | t = final





General Information
- Test Agency ..... E-TECH Testing Services, Inc.
- Test Designation ..... NCHRP 350 Test 3-35
- Test No. 01-7622-014
- Date 5/14/98

Test Article
- Type ..... E-TECH Testing Services, Inc.
- ..... REGENT System with
- ..... NCHRP 350 "Weak" Soil
- Installation Length ..... 11430 mm
- Size and/or dimension and material of key elements (mm) ..... 11430 Terminal Length
- ..... 1219 Terminal Flare
- ..... 22860 Downstream Rail

Test Vehicle
- Type ..... Production Model
- Designation 2000P
- Model ..... 1989 Chevrolet C2500
- ..... 3/4T Pickup
- Mass (kg)
  - Curb 1919.8
  - Test inertial 1995.4
  - Dummy(s) ..... N/A
  - Gross Static 1995.4

Impact Conditions
- Speed (km/h) 101.69
- Angle (deg) 20.0
- Impact Severity (kJ) 93.14

Exit conditions
- Speed (km/h) 52.20
- Angle (deg) 15.0

Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction 4.73
  - y-direction 3.92
- Ridedown Acceleration (g's)
  - x-direction ..... -6.91
  - y-direction ..... -11.94
- THIV (m/s) 6.86
- PHD (g's) 8.44
- ASI 0.64

Test Article Deflections (m)
- Dynamic 2.1
- Permanent 1.9

Vehicle Damage
- Exterior
  - VDS RFQ-5
  - CDC 11LDEW2
- Interior
  - OCDI AS0000000

Post-Impact Vehicular Behavior (deg - gyro @ c.g.)
- Maximum Roll Angle 6.25
- Maximum Pitch Angle 3.04
- Maximum Yaw Angle ..... -43.06

Figure 21. Summary of Results - REGENT System Test 01-7622-014